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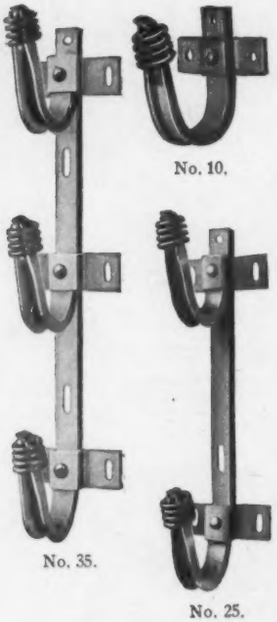

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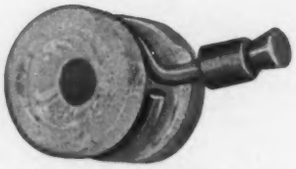

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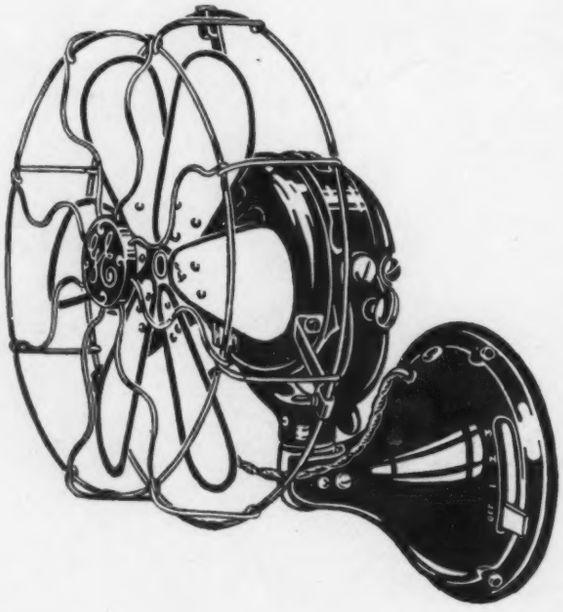

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NEW INDIRECT LIGHTING SYSTEM

BY OTTO H. MOHR.

(This article describes a western product—a self-contained indirect lighting unit. The author discusses the fundamentals of good lighting and describes how these have been secured in the designs and uses of this new system.—The Editors.)

Daylight is a mixture of two kinds of light, and its quality changes continually as the day progresses. It is most satisfactory and pleasing from sunrise until 10 a. m. and from 3 p. m. until sunset, for between these hours the eyes are exposed to the lower intensities and the light is then very diffuse.

At noon, on an unclouded day, daylight is almost entirely sunlight, and at this time an unobstructed surface receives directly from the sun, eighty-five per cent of its incident light, and but fifteen per cent from the sky dome. On such occasions, the intensity is from eight thousand to nine thousand times greater than the eye needs to read ordinary print, and to use the eyes to any extent under this light is inadvisable, especially for close work.

Too strong a glare does not increase lighting effectiveness, but lessens it if too great, for objects cannot then be seen plainly. There is a certain intensity beyond which light not only ceases to be real illumination, but in which it defeats its own purpose by unduly fatiguing the eye. The best lighting is that which produces the utmost clearness without straining the sight, which enables that to be most easily seen for which the system has been planned.

A very large proportion of the "tired feeling" so pronounced in city life, and which differs widely from

Bank Lighting Installation of the New Indirect System.

the weariness resulting from a day in the country, is due to eye-strain. It is a great mistake to suppose that the steady use of the eyes under proper lighting is harmful.

Artificial light requires a much more careful use than sunlight, the latter having been filtered through many miles of air before finding its way to the earth's surface. In this filtering process many of the more harmful rays of light are removed. The extreme rays which lie at either end of the spectrum—the rays outside the red of the rainbow and the rays beyond the

An Architect's Design to Conform to Decorations.

"blue" (known as the infra-red and the ultra-violet)—are very injurious and it is these which hurt our eyes in some systems of artificial lighting.

The problem is, how best to apply the essential natural characteristics and requirements to artificial systems.

The terms direct, indirect or semi-indirect, are merely descriptive in a general way, and really do not give the essential differences in these methods of lighting. The real division is on the basis of the size of the source. The tendency is toward larger sources, whether we obtain them by means of large diffusing and transmitting mediums or by reflection from a secondary light-giving area or diffusely reflecting surface. The important points to consider are the intrinsic brilliancy or surface brightness exposed to the eyes, and the direction of light.

Oculists, engineers and architects have long recognized the advantages of indirect lighting, and even to the average layman its merits have been apparent, but its progress as a universal lighting system has been greatly retarded, due to the fact that in the past, it has been wholly dependent upon the walls and ceiling for its reflecting and diffusing qualities.

The walls and ceiling of any interior require a certain amount of light to show off to the best advantage any architectural or structural design, and where ornamentation occurs, a definite amount and direction is required, but to flood these surfaces with light often results in a very unnatural appearance and also proves to be expensive, due to the high absorption of light from such surfaces. There may also be specular reflection due to the directing of light of high intrinsic brilliancy upon smooth surfaces.

That "decoration is limited to light tints" also constituted one of the strong arguments advanced by the proponents of direct lighting in endeavoring to combat the advance of the new indirect method, while the fear of added decoration costs and the nuisance of constant re-decorating also acted as a deterrent to its general adoption.

To overcome these objections and to duplicate desirable daylight conditions as nearly as possible, a self-contained indirect lighting fixture has been designed and patented by the Mohrlite Company and is illustrated herewith. In this fixture the light flux is projected by a diffuse reflector upon a cone shaped diffusing surface, which forms the upper part of the fixture placed on the ceiling. By properly proportioning the reflector and diffusing surface the light is reflected at the proper angle to the working plane, sufficient light being directed to the ceiling and the side walls without having any visible surface illuminated beyond the allowable range for surface brightness. A wide range of distribution is possible.

The reflecting surface is made of bone and wood ash, and is permanent, easily cleaned, efficient, and above all, gives excellent diffusion.

The diffusion of the light flux by this unit is so good that a less intensity of illumination than usual is required on the working plane. A good diffuse lighting system increases the visual acuity or seeing efficiency, and when this is accomplished a lighting unit is efficient because effective.

There is no limit to the size of the units. For example, in the counsel chambers of the Oakland City Hall, six small domes of 32 sq. ft. each, six rectangular domes of 144 sq. ft. each and three large center domes of 160 sq. ft. each, have been satisfactorily installed.

Commercial Type of Fixture.

The typical photometric curve shows that the "slip light" has received proper attention. Architectural designs, ornamentations or wall hangings, etc., may receive the amount of light required to bring out the true color and design intended.

UNDERGROUND ELECTRIC MINE HAULAGE

(The following papers were presented before the Electrical Section of the Nevada Industrial Safety Conference at Reno, Nevada, on April 20th, 1914. They cover present practice and future possibilities, especially with regard to safety, and several experimental installations are also described.—The Editors.)

SAFETY IN UNDERGROUND ELECTRIC HAULAGE.

BY F. O. BROILI.

(In this article the author reviews the possible danger even of low voltage systems for underground haulage and discusses the requirements of storage battery locomotives for this purpose.—The Editors.)

The use of an electric trolley wire underground presents a source of danger dependent principally on the voltage and whether the underground workings are hot and dry.

Hot underground workings, like those of the Virginia City district cause heavy perspiration, making a favorable condition for severe shock. The writer has in mind a case in which a miner came in contact with a 110 volt, a.c. lighting system in a warm and wet tunnel. The wire, touching him on the shoulder, caused him to get the wire under his arm, rendering him unconscious instantly. His fellow workmen had trouble getting him removed. The shock evidently had some bad effect on his system, as he was put on a hand car and driven to the surface, but he contracted pneumonia and died within forty-eight hours. He did not get over 110 volts, as there were only two wires at 110 volts which were part of a three-wire system, with the neutral grounded. However, if the man had not managed to get the wire wrapped around himself, the shock would have been comparatively slight.

In some of the coal region states, the use of 500 volt trolleys underground is prohibited but 250 volts is allowed. For Nevada conditions, when d.c. is used, this generally requires a motor generator set of some kind as power is obtained mostly from some large power company distributing three-phase. Single-phase mine locomotives have not yet been developed commercially, although some of our progressive mining companies in Nevada some of our progressive mining purpose these have given excellent results. No doubt they will be developed commercially in the near future. The trolley voltage could be about 100, supplied from transformers at short intervals as the high voltage line could be safely insulated. Whether this would prove advisable from a commercial standpoint could be determined only for each individual installation. The object of using the 100 or 125 volt single-phase a.c. would be to reduce the danger, as a 250 volt a.c. trolley in many mines would be very dangerous, decidedly more so than a d.c. system of the same voltage.

A system that will receive more consideration in the future, especially from a standpoint of safety, will be the storage battery locomotive. While fair results can be obtained with lead batteries, the writer is of the opinion that Edison batteries, even at a much higher cost, would be cheaper for any service over two or three years.

Where storage batteries are used, a very important item is the friction of the bearings of the ore car. In some experiments made on two-ton ore cars, hauled by a storage battery locomotive, the writer found that a good type of roller bearing took only one-half the power to operate as that required by a babbitted bearing using 14 in. wheels of the McCaskill type.

This makes a very pronounced difference in the capacity of the batteries required. Experience with the two types of bearings for a year would indicate the average friction of the roller bearings during that time was only 35 to 45 per cent of that of the babbitted, self-oiling bearings. The babbitted bearings under observation were all babbitted with a high grade metal at the beginning of the test. The roller bearings had rolls approximately ¾ in. in diameter, 6 in. long in each wheel and after nearly four years' service, not one single instance of trouble has been reported. They are greased every six months, whereas the self-oiling bearings have to be oiled every week.

The writer believes that storage battery locomotives for the average underground conditions of Nevada offer the most satisfactory solution of mine haulage, at least from the point of view of safety, and, in many cases, from the economic side. The points to consider in making the installation satisfactory are the use of roller bearings and the proper battery for the conditions.

Most locomotives do not have enough battery capacity to do their work efficiently. There should be no hesitancy whatever about adding a trailer to the locomotive to carry sufficient batteries. The batteries on the locomotive should be so arranged that they can be easily removed for repairs to the locomotive, even going to the expense, if necessary, of putting all the batteries on the trailer and having easily removed weights on the locomotive to prevent the wheels slipping on heavy loads, as a mine locomotive has a draw bar pull of only 20 to 25 per cent of its weight. The draw bar pull can be increased by using steel rimmed drivers.

In designing a trailer, elastic spring supports should be provided for the batteries, as these make a great difference in their life.

POSSIBILITIES IN SINGLE-PHASE TRACTION UNDERGROUND.

BY T. R. LANDSBOROUGH.

(The advantages and possibilities of low voltage single phase underground traction are presented in this paper. An experimental installation is described in detail.—The Editors.)

With the development of the single-phase compensated series motor for use in heavy railroading, using current at 25 cycles and lower, the single-phase repulsion motor deserves some mention in connection with mining work for use in small units, especially on 60 cycle circuits. This, I believe, is the standard frequency throughout Nevada.

For underground and surface haulage the single-phase installation will show quite a saving over a d.c. equipment, in that no motor generator set would be required. A motor generator set requires some expert attendance, besides occupying valuable space underground.

Compared to a storage battery locomotive equipment, we have the storage cells and the charging to be taken care of in addition to the motor generator or rectifier set for charging.

Another advantage of the single-phase system is the low voltage that may be used on the trolley wire. I would advocate a trolley voltage of 110 to 125 volts a.c. for underground work as being absolutely safe. This could be accomplished by having a pair of feeders paralleling the track and carrying whatever voltage is brought underground; (440 volts is most common), At intervals depending on the load, transformers may be placed stepping down from 440 to 110 for feeding the trolley.

While 220 volts a.c. has produced some fatalities, 110 volts is deemed unable to do any injury, even in very wet places.

Regarding the motor: The control can be made very simple, a reversing switch and two or three steps of resistance being all that is required. With full voltage on the motor terminals, it will develop two and one-half times full load torque at standstill, increasing to about three and one-half times full load torque at about half speed. The motor will therefore accelerate any load that it can start. The motor may be instantaneously reversed without injury, thus making it nearly fool-proof.

Repulsion motors have not been designed in the railway type in small sizes but that will be accomplished as soon as there is a demand. In my estimation, the manufacturing companies have not attempted to develop the possibilities of this type of motor for haulage work for the reason that a single-phase system would deprive them of the sale of motor generator sets and other accessories used in d.c. work.

At this time I might mention a small experimental ore car, designed by the writer, equipped with a 5 h.p. General Electric repulsion motor of the reversible type, having a speed of 1200 r.p.m. This car is of the gable bottom type, side dumping with two doors. The length of haul is approximately 1500 ft. up an average grade of 3 per cent. The car has a capacity of 3 tons and has a full load speed of 8 miles per hour. It makes a round trip in eight minutes or has a capacity of 22½ tons per hour. The car is driven through a back gear reduction and a chain to one axle. This axle also carries a brake drum, an asbestos lined band brake being used. Current at 220 volts is collected from a third rail which consists of an eight pound mine rail bonded and paralleled by a No. 4 copper wire. The track rails are 20 lb. with one rail bonded. Gauge of track is 24 in. This car has been in service for about two months at the Tonopah Extension Mining Company's plant, Tonopah, Nevada, and thus far its operation has been entirely satisfactory, although it is probably a little early to form any definite conclusions. Small cars and locomotives with repulsion motor drive should have quite an extensive field in mining operations both underground and on the surface.

VOLTAGES ON UNDERGROUND TROLLEY SYSTEMS.

BY G. B. BURNHAM.

(The author reviews present practice in the use of electric mine locomotives and in the interests of safety recommends a method of lighting which will aid in eliminating accidents.—The Editors.)

In the use of electric mine locomotives for the hauling of ore in underground tunnel work the question of a suitable voltage for operation has always been important. On the one hand it is desirous to use a high voltage in order to get good operative characteristics, while from the standpoint of safety to the men working in the mine it is even more important to use a low voltage system.

The almost universal practice in mines is to use direct current and about eighty per cent of this is two hundred and fifty volts. Several of the larger mines have used five hundred volts, but there is a growing sentiment against it and the state of Ohio prohibits its use. There is one installation in this country of three-phase alternating current. However, direct current is so satisfactory that the use of alternating current is now limited.

As to the danger encountered in underground trolleys with voltages of two hundred and fifty or over, it has been found that fewer accidents have occurred than might at first be supposed. In some mines the trolley is run in a wooden trough, the sides of which are three or four inches deep, thereby protecting the trolley from accidental contact from the side and also, to some extent, from the bottom. The overhead trolley is not run into the drifts from which the ore is gathered, but the end of an insulated cable on a reel on the locomotive is attached to the trolley, where it stops, and current for operating the locomotive is taken through this cable.

Another common practice toward safety is to locate the trolley at one side of the roadway so that the men will have the middle and the other side of the roadway clear.

Occasionally men and mules get in contact with the wire but fatal accidents seldom happen if the direct current does not exceed two hundred and fifty volts. Alternating current of this voltage would be more serious and also the use of a third rail system instead of a trolley tends to increase the liability to accidents.

In general, where the men are able to see the position of the trolley at all times accidents rarely occur. Many mines have minimized the danger of coming in contact with the wires by the use of diffused light throughout the tunnel. The walls of the passageways at curves, crossovers and junctions and at intervals of five hundred feet on straight track are coated with a band of whitewash fifteen to twenty feet wide and a lamp with proper reflector is used to direct the light against this white strip. The result is that the tunnel is illuminated with a soft diffused light, and, as the lamp is hidden from view, there is no glare. Not only is the position of the trolley easily located but if the mine locomotive or any other object is coming up the track it is silhouetted against the white background making it easily seen.

METHODS AND SAFETY IN UNDERGROUND ELECTRIC MINE HAULAGE.

BY R. E. MIDDAGH.

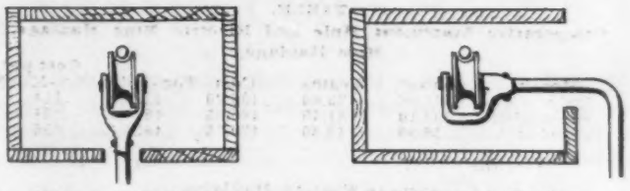
(This paper reviews present electrical methods of mine haulage in their bearing upon safety. The conversion of a trolley locomotive into one using storage batteries is also described.—The Editors.)

The present day methods of mine haulage can, roughly speaking, be divided into two general classes i.e. animal and mechanical, and these two main divisions can again be segregated into sub-headings without number. Considering the scope of this paper, however, we will discuss only the motor driven electric type.

In treating the above subject for convenience sake we will divide it into two parts, each to be gone over separately, followed by a discussion of the recent work done at the Steptoe Valley Smelting & Mining Company's plant at McGill, Nevada.

We will first take up the underground mine haulage by what is commonly called the main line trolley system, showing both its advantages and drawbacks but keeping always in mind the object of this paper, namely Safety First.

The underground trolley systems of today are with few exceptions of the direct current type and most generally carry 250 volts on the trolley, although there are places where a.c. is used, notably the Wellington Mines Company, Breckenridge, Colo., where a two trolley and ground three-phase a.c. system is in practical operation. This latter installation goes to prove the practicability of the a.c. current for underground work but the author can see no advantages gained thereby which could be applied with safety to mines. The main advantage of either poly- or single-phase a.c. current would be to use a rather higher voltage on trolley and feeder, thus eliminating to a great extent the line loss and consequent drop in voltage which in some mines amounts to considerable. But when considering this advantage from the point of view of the safety engineer it is totally eclipsed by the increased danger to those who have to work where it is used. The standard 250 volts for trolley, whether of a.c. or d.c., seems to be the ultimate for underground service if safety and economy are both to be considered. A higher voltage puts undue risk on those working nearby and a lower voltage entails too great an increase in first cost of the trolley and subsequent line losses to be practical. The author does not want to make the statement that 250 and no other voltage can be used, for under certain conditions a higher voltage could be used to advantage and with the same degree of safety but as a general rule in mines the 250 volt trolley should seldom be exceeded and then only after a most careful study of all working conditions. There has been much discussion as to a protecting hood for trolleys whereby accidental contact would be made impossible and so permit of a rather higher trolley voltage, but though the writer has seen many such schemes on paper such as those here illustrated, he has yet to know of one which has been in successful operation or to hear of one the first cost of which would not be prohibitive. As to the relative advantages of a.c. or d.c. current underground other things being equal, I would like to make the following points; from the commercial end d.c. seems to have at least a shade the best of it at present, due mainly to the design of motors and control apparatus. A d.c. motor shows as a rule a better all round efficiency, as for example at a given torque on starting it does not require the excessive current necessary to the a.c. motor of either poly- or single-phase. Again we have in the control apparatus of d.c. motors a point in favor of this system, it being as it is much more flexible than anything as yet produced in the a.c. line. And again coming back to Safety First we find the danger in case of contact, less with d.c. It is a commonly known fact among electricians that while a man has comparatively little trouble in getting away from a d.c. wire, the a.c. has a tendency to hold him in contact. So in summing up the two methods it seems to the author that the logical system from an engineering as well as a safety standpoint is the d.c., using as low a trolley voltage as is permissible without undue loss.



Proposed Protecting Hoods for Underground Trolleys.

Secondly we will consider the storage battery loco system which at the present time bids fair to supplant the main line trolley in many, if not all installations and also admits of application in many cases where the comparative high first cost of the main line trolley is prohibitive. There are several prominent installations of this system throughout the country, the Alaska Gastineau Mining Company and the Ore Reduction & Transportation Company of Idaho Springs, Colo., being two that come to mind as most typical. Of these two we will only consider one, the Big Five Tunnel installation of the Ore Reduction & Transportation Company, as from information obtainable this seems to have been the pioneer installation to be equipped with the new Edison iron-nickel cell, which cell it is claimed has done more than any other one item to make the undertaking a success. The loco is of the Westinghouse-Baldwin Scotch yoke type, carrying its battery of 208 type A-6 latest improved Edison iron-nickel cells on a trailer or battery car and being equipped with a trolley pole for use outside of the mines when engaged in switching or other yard service. This installation was put in to replace mule haulage and has not only proved entirely satisfactory but has shown a material decrease in the transportation charges per ton-mile, as shown in the accompanying table. The equipment here is rather unique, combining as it does the advantages of the storage battery underground and the low cost of operation of the main line trolley on the surface, a combination which in this case at least leaves little to be desired from either an engineering or a safety point of view. The battery loco immediately presents advantages to the trained engineer that no other system can equal. The first cost is small, small in comparison to the main line trolley, as trolley wires and other auxiliary equipment underground becomes unnecessary and right here it might be well to mention that this fact also removes the danger to the underground men and safety arises as a head liner under the advantages of this system. Safety from accidental

TABLE.

Comparative Statement Mule and Electric Mine Haulage.

Mule Haulage.

Month.	Labor.	Teams.	Cost.	Ton-Miles.	Cost per Ton-Miles.
July	291.20	199.60	490.80	4290.2	.114
September	299.10	181.45	480.55	4620.6	.104
October	326.95	143.80	470.75	4921.1	.096
Average				4610	$0.1043

Storage Battery Haulage.

Month.	Labor.	Repairs.	Power.	Ton-Miles.	Cost per Ton-Miles.
December	200.50	34.18	56.21	4451.5	.065
January	192.25	54.14	55.60	4490.6	.067
February	259.75	32.36	58.30	4832.0	.073
Average				4590	$0.0683

Saving effected $0.036 per ton-mile, or nearly one-third. Months were taken that correspond nearly in ton-miles hauled.

contact with live wires and also safety from trolley sparking which in many mines, where explosive gases are present, is a menace not to be overlooked. Again, we have a flexibility heretofore unknown to the electric motor, no stopping a hundred feet or so from the headings on account of uncompleted trolley, no waiting for repairs to an accidentally damaged line and consequent to that no working on a hot trolley under the most unfavorable of conditions when even the most experienced and careful of electricians are so apt to make a false move with the inevitable result of an accident of a more or less severe nature. Of course there are drawbacks as well as advantages to this system, the rather higher operating cost than for main line trolley and the liability to "run short" being two of the most important but after a closer study of these drawbacks the writer is of the opinion that they can be classed with the mole hill rather than with the mountain. The danger of "running short" while underground is slight if proper precaution is taken as to charging and the motor man well instructed as to determining the condition of his battery. While there is no gainsaying the rather higher operating cost of this system over the main line trolley, it is a matter of much speculation as to whether or not these costs can not be materially lowered in future installations and even though they are not materially decreased, whether or no the extra cost is not money well expended in the cause of Safety First. The author is of the opinion that it is.

As a conclusion to the foregoing paper I wish to add an account (as far as we have gone) of how the author is working out the conversion of electric locos built for trolley service, to the storage battery system. I wish to bring out two points—the practicability of and the advantages gained by this change.

The apparatus in question consists of two Westinghouse-Baldwin 10 ton locos built for trolley service at 220 volts, which were bought for our mines but never used. The conditions are the replacement of steam engines for concentrate haulage from our mill to the scale house half mile distant pulling a dead load when loaded of 278,000 lb. and 75,000 lb. empty. This will be 176½ ton-miles per round trip, eith of which are on an average made per shift of eight hours. In the mill building there is a run of approximately 200 yd. under the concentrates tanks where very little head room is available and then only to have structural steel near you. It is this indoor run that has necessitated the replacement of the steam engine with its consequent smoke and it is also this run that has made a trolley installation both expensive and dangerous, although low trolley wires even on the outside were not considered as best, due to road crossings and the combined use of the rails or both steam and electric service. After it was decided to use storage battery locos, the reconstruction of the old ones started. First they were changed from a thirty to a standard gauge, a job which proved quite simple and then calculations for battery equipment were put under way. While we have not as yet definitely decided on the battery to be used, the preliminary figures seem to point to the use of a trailer equipped with either 190 cells of type A-8H or 210 cells of type A-6H Edison iron-nickel storage battery and using the same motors and control apparatus, without change in any way, as were already on our locos when equipped for trolley service. While I am not in a position at the present time to give figures on this installation, I would say that the first cost with batteries is considerably less than the trolley would have been and all things considered I do not expect the operating costs to run much, if any, above that of the trolley. We also have the advantage of being able to run our locos wherever standard track is available whereas should we have decided on the main line trolley our operations would have been limited to the half mile run of electrified road.

POLE TEST CONCLUSIONS.

Tests by the Forest Service of the department of agriculture on poles and on specimens cut from them, show that—

1. Air-seasoned lodgepole pine poles cut from live timber in Montana were fully equal in strength to the cedar poles tested. In actual stress developed they were superior, but on account of the greater taper of the cedar poles this advantage was lost in a comparison based on equal top diameters, the dimension usually specified.

2. Cedar poles were superior to the pine and spruce poles cut from a fire-killed area in Colorado, in maximum load developed. The three shipments were, however, practically equal at the elastic limit. Were the native poles to be used in place of cedar without change of specifications, it would follow that the factor of safety would be reduced one-fifth for conditions at failure, but would remain the same for stresses at the elastic limit.

3. The fire-killed pine, after standing 10 years, did not show deterioration to any appreciable extent when compared to seasoned lodgepole pine cut from representative live trees in Wyoming and Colorado. The advantage in strength of the material from the lodgepole pine poles from Montana can be accounted for by the fact that it was above normal in weight—at least for lodgepole pine from the southern part of its range.

4. The ratio between the strength of the poles and the strength of the clear material cut from them is not constant for the different kinds of wood. This "efficiency" factor varied from 0.74 to 0.48 of the strength of the clear wood when the comparison is made as tested, and from 0.98 to 0.65 when compared on the basis of values estimated to represent the same moisture condition in the small pieces as existed in the poles when tested. The values were highest for the cedar and lowest for the spruce, the pine representing an average for the three species.

PUBLIC POLICY OF PUBLIC UTILITY CORPORATIONS

DISCUSSION ON PUBLIC POLICY PAPER.

(This discussion followed the presentation of Mr. John A. Britton's paper at the San Francisco Section meeting A. I. E. E. The paper was given in full in our last issue. A. H. Griswold was chairman of the meeting.—The Editors.)

The Chairman: Illustrative of the point which Mr. Britton has made, that the success or failure of a public service corporation does not rest with its officials, but rather, to a very great extent, with the rank and file, I am reminded of what the general manager, or, as Mr. Britton has said, the paymaster of a large corporation, once said when granting some increases of salary, "I am not granting these increases because the company has lots of money, because it has not; but I am granting them because I want you to help me."

C. L. Cory: Mr. Chairman and Gentlemen—As I was listening to the presentation of this very important subject by Mr. Britton, one word came into my mind as perhaps most thought of by the speaker, the word "mutuality." Certainly the great corporations today entering upon the work that is to be done and can only be done by corporations, first of all, accept a great responsibility.

I cannot help but liken the corporation of today to the central pier of a bridge over a torrential turbulent stream, that however is for long periods of time quiescent. First, the corporation has its responsibility to its own individual stockholders, whose interests unquestionably should be protected, not only by the corporation itself but by any relationship that this corporation may have to the commonwealth, the state or city in which such corporation may carry on its business. Second, unquestionably the corporation accepts an obligation, and a very great obligation, to its own employes. Finally, of course, its principal and most direct obligation is to its customers.

On the far end of this bridge one finds the people who receive the service; on the other end are the employes of the company; the corporation is solely responsible for the stability and reliability of the structure in storm as well as in fair weather.

As engineers, and those interested in the profession of engineering, I think we cannot too carefully give heed to one point very strongly brought out in the paper, the obligation of the employe of the corporation to the organization he represents. It is a serious thing for a man at any time of life to find that the road that he has traveled, in some way entirely beyond his control, is blocked, that he cannot journey along that particular highway any further. A great number of employes of corporations, I think, appreciate today more than ever before that the real and ultimate success of the corporations is very closely interwoven with the individual success of its employes and the practice of the profession of engineering depends primarily upon loyal service.

To speak frankly I think all of us here are perhaps well aware that today there are many men, able men, near middle life, who have given the best years of their service to corporations, and now, through no fault of either their employes or themselves find themselves dependent upon absolutely new fields of endeavor. It therefore behooves us as engineers to give thoughtful consideration to the point that has been brought out this evening by Mr. Britton on the Public Policy of Corporations. We all know that human nature is much the same in all of us. It is difficult for us to see the other fellow's side.

I am reminded of a little story that I read the other day, about a young lady school teacher, who sent a little girl named Elsie, one of her pupils, out to buy some plums, telling her that she should pinch one or two of the plums before buying them to make sure they were ripe. In a little while Elsie returned smiling radiantly and very happy. She said, "I pinched one or two of the plums as you told me to do, and then when the man wasn't looking I pinched a whole bag full. Here are the plums and I brought the money back too."

The attitude of that little girl illustrates human nature, and without saying unkind things about the attitude of the people toward corporations, I think that perhaps some of us at times, particularly when the telephone service is not at its best, or during a very cold season when the gas company may have had great difficulty in distributing gas in a practically new territory, which had been comparatively little inhabited prior to the great catastrophe, I think we generally are very much inclined to take the point of view of little Elsie whose idea of mutual obligation is absolutely the opposite of the Public Policy that has been outlined by Mr. Britton.

We are hearing today about the difficulties that some investors have had in various corporations, one in particular, an Eastern railway system in old New England. Such financial wrecks are to be greatly regretted. There is no question about that. What the ideal is and the mutual obligation, of course, as outlined this evening, is that those people who are willing and find it to their interest to place their funds, such as they may be, in the hands of a great corporation can rest assured that those funds will be handled with just as much care, just as great security as might be possible if the funds were placed in one of our Federal banking institutions.

Again, I was reminded while Mr. Britton was readng his paper of the mutual necessity of any relationship being an advantage to both people. I recall a very large electric power contract that was under consideration a few years ago on this side of the Rocky Mountains. The situation was something like this: A large mining company, low grade copper company in fact, had been using steam as the source of power. The amount of ore crushed and treated had increased from 1907 to 1912 from 7000 tons each day to 20,000 tons per day. The cost of power, even using fuel, had been reduced from 13 cents a ton to about 6 cents a ton. The time had come when the burning of fuel, coal in this case, did not seem desirable. An arrangement was then being considered for the purchase of a large amount of electric power, anywhere from 12,000 to 30,000 h.p., this contract to be in existence not less than 25 years. It was assumed that this particular mining company would be busy at the rate of 20,000 tons for about 150 years in recovering that very useful metal, to all electrical men—copper—from that mountain into the copper that might be of service. The head of the mining company, in giving advice to those who were to represent that company in these negotiations, gave these very striking instructions:

"Now, in discussing this contract, please understand that the line of mutual interest between the hydroelectric power company and our mining company is just as artificial as the dividing line between the northern boundary of Utah and the southern boundary of Idaho." "No obligation"—to use his own words—"is worth while, unless it is mutually satisfactory, not for a time, but for as long as the obligation can be maintained; and what we want here is to stop burning coal, the natural resources of this community and use this water in the mountains to produce power with which to reduce the ore and thereby take advantage of one of our natural resources, water, and conserve the other for a different use. In discussing this contract then, bear in mind we want noth-

ing we should not have, nor do we want anything that, if the interests were reversed would not be the principles you would stand for."

That, gentlemen, is the crux of the entire situation. In this matter of the public policy of corporations, as far as employes are concerned, or as far as the service to us as consumers is concerned, it is not the thing that is of advantage to you or to me today; the thing that is worth while will be the thing that is of advantage to both of us if we are mutually related, to both of us in all endeavors, not for a short time, but for all time.

Finally it seems to me that perhaps one little expression might cover the sentiment that Mr. Britton has given us. It does not make any difference to those concerned, whether we may be placed in the very important position of responsibility of directing the policy and operations of the great corporations and the service they are now giving could never be accomplished in any other way, or whether perchance we may be in any relation an employe of these corporations, or whether the success of our endeavors may be dependent upon the opportunities that may come to us from such corporations, what Mr. Britton has said to us this evening, is merely this: "To thine own self be true."

A. H. Halloran: Mr. Chairman and members of the Institute, while listening to Mr. Britton's ideas as to what should be the public policy of a public service corporation, I have been impressed with the thought that Mr. Britton has presented what may well be called a declaration of principles. His declaration is on such a high ethical plane that it may be difficult perhaps for every corporation to live up to all that it implies, but regarding it as an ideal toward which every employe of every corporation should work, it can do much in gaining the friendship and confidence of the people.

"Success is the science of being believed in."

If the public firmly believe that the corporation is trying to live up to these ideals, the corporation's success would be assured, and the prevalent feeling of hostility toward the public service corporation would be eliminated.

This feeling of hostility is largely the fault of the corporation in not telling its side of the story. Politicians and newspapers frequently make misstatements of facts, which the corporation allows to go unchallenged, and so the politician wins merely by the default of the corporation in putting the real facts before the people.

Professor Cory's "mutuality of interests" suggests that the relation between the public and the public service corporation is one of partnership, and that whatever hampers the corporation retards the development of the community served. If this fact could be impressed upon all the people it would do a great deal to counteract any hostile feeling.

Another viewpoint of the relation between the public and the corporation is that taken by Mr. Max Thelen, commissioner and attorney for the California Railroad Commission, who regards the corporation as the "agent" for the public, as "principal."

While these two viewpoints differ in many respects and lead to different conclusions, they have one point in common—the necessity for frank and open dealing with the public. In order to improve the relationship, the managing partner should keep the silent partner fully informed of the conditions of the business, the agent should keep his principal posted on the status of his affairs. In other words, the salvation of the corporation depends on free and open publicity. Consequently every means should be used—lectures, the courts, the press—in converting the people to the idea that the corporation really has their interest at heart.

In what may be termed the private policy of the corporation, Mr. Britton has outlined the first step of this campaign of education. Once these principles of loyalty and of enthusiasm have been instilled into the mind of the employe, who by the way, is an integral part of the public, he can make it known that his is a "corporation with a soul."

This idea of the corporation with a soul, is the keynote of the new policy of winning friends. Nor is the soul the indefinite hypothetical thing that we were perhaps taught in the Sunday school.

In his book on "Crowds," Gerald Stanley Lee defines a man's soul as "the faculty in him for seeing the whole in relation to the part—his vision for others in relation to his vision for himself." But is not this the very object of true public service, and should not this spirit, or this faculty, be the actuating impulse in every public service corporation?

Regard the corporation soul as the sense of proportion concerning the rights of others, let it combine the ideal of the service of all men by all other men with the conception of the value of the individual; express this spirit as an active working principle in all business dealings, and the corporation will be believed in, if proper publicity be given to this change of attitude.

The problem of teaching these facts to the Pacific Coast public is different from that of educating the people in Eastern communities, and requires local action. While National associations have given much thought to the subject, they have not had the necessary machinery to get action. Conditions differ greatly in each section of the country, and a specialized campaign suitable for the New England states would not meet the needs of the Pacific Coast. All kinds of public service corporations here have a common cause in creating a more favorable public opinion. While other interests of electric light, electric railway, steam railway, telephone and gas companies may be divergent, their problem is identical in educating public opinion.

This in turn means reaching the individual, for the public is only an aggregate of individuals. A single drop of water in itself is weak, yet combined with millions of other drops, and given the advantage of a difference in elevation, it can sweep aside everything in its path. Thus it is with public opinion—given motion and number it is irresistible. The machinations of lawyers and politicians can no more stem the flood than can the utmost contrivance of the engineer stop the force from a broken dam.

Without proper guidance power vents itself destructively. If led through proper channels, it can be utilized beneficially. So public opinion can be educated, literally led out, by a properly planned and executed campaign of publicity.

The most logical solution of the problem would be the formation of an association of all utility companies. They should first get together and discuss the conditions, then come out with a frank and open avowal of their purpose, realizing that "Honesty is the best policy" of a corporation as well as an individual.

The Chairman: I am going to ask Mr. Babcock to continue the discussion.

A. H. Babcock: Mr. Chairman and Mr. Britton—One point I was a little surprised Mr. Britton did not bring out, the value of having the employe, in his daily contact with the public, do his part toward the education of that public, toward the stopping of senseless complaints. I think probably we railroad men come in contact with the public in a more intimate way than the servants of some of the other public service corporations. The senseless and endless complaints of the traveling public over the ordinary delays of traffic, over the ordinary discomforts of the dining car or of the sleeping car, become so burdensome to a railroad man that he is prone to lock himself up and shut himself away from the public. I know I have done it and done it repeatedly. On the other hand, I have seen opportunities for helping direct public opinion.

I think it is within the power of every one of us to check the little annoyances of the public with whom we come in

contact. Let them see the other side, the things that we have to contend with, so that when there is complaint about the light going out or the regulation being poor or the trains off of their schedule, there can be a better understanding by the public.

Another point Mr. Britton brought up, the loyalty of the individual to the company. He said, if I remember correctly, that he had no use for a man who was not absolutely loyal to the company. The corollary to that is this, the obligation on the part of the upper officers of the company to see that there is ground for our being loyal and to see that there is an example in the top ranks that forces the follower to follow whether he wants to or not. It is not possible for all of us to be entirely free and independent; it is not given to every one of us to be able to say "If I cannot subscribe to the ideas of this concern, I will go elsewhere." Sometimes we are obliged by bread and butter necessities to live our official lives under men who have not been the corporate leaders that they ought to have been. Very happily in the majority of cases on this Coast the reverse has been the case, and there is no excuse for not being loyal, loyal in every sense of the word. My particular summing up of the situation, and my belief is that every one of us coming in contact with the public should do his part to train and to educate the public so that our point of view will be seen quite as prominently as theirs.

The Chairman: Is there any one else that would like to contribute to the discussion? Mr. Britton, would you care to say anything in closing?

John A. Britton: Just a thought, Mr. Chairman, brought out by what Mr. Babcock has said; that is, with respect to this attitude of the general public towards the corporations.

I mentioned in my preliminary statement that I had a talk with a body of men at Sacramento today, the subject of the attitude of the public was my theme and my only theme, and I was gratified at the close of the address which I gave there at the enthusiasm with which the suggestions that I made in that line were received, and it gave me a new line of thought. They were business men that I was talking to, men of affairs, all of them, men who had made a success in their own particular line of life, and they were all thinkers, the idea came to my mind then and subsequently as I journeyed from Sacramento to here, that there has been a lack on the part of the corporation man in presenting his view point to the public and impressing the public with the sincerity of the corporation's side of the question. Most men engaged in their own business affairs have little time or consideration for others unless their interests lie along parallel lines, and it is astonishing to me as a corporation man to note the indifference that exists even on the part of stockholders of the corporations as to its welfare. And I attribute that largely to the fact that they are not as thoroughly advised as they should be any more than the business men are advised nor the general public; and I believe with Mr. Halloran that there should be and is going to be on the part of corporations from now on more of that publicity, more of that taking the public into the confidence of the corporation. Of course, it is being forced upon them by this public regulation. And I want to say in emphasis of that fact that I believe the best thing that ever happened in the state of California was the renewed activities, the reformation, I might say the re-formation as well, of the railroad commission. Every public service corporation man who is honest in his own intent cannot help but welcome a regulation that takes the question of his operations out of the hands of the general public, because the general public is a most uncertain thing. It has thoughts and fancies today that do not comport with its thoughts and fancies of yesterday, or of tomorrow. And the employes of corporatons, being but human beings and pursuing always the path of least resistance, have allowed themselves, in order to be friends with everybody, to get into a condition that needed reformation, and that can only be brought about by such a body as the railroad commission is now, in the state of California, in Wisconsin, New York, New Jersey and in a great many of other progressive states, and we welcome that. But what I want to convey to you is that, that my thought today after my address in Sacramento, was that we corporation men had made a great mistake all of our lives in not talking plainly and frankly with the people with whom we came into contact, that we were hiding our light under a bushel and that by reason of our silence everything that we did was taken under suspicion; and this plan of publicity is going to be worked stronger and stronger in this state; and when the public realizes that a corporation, as I have said before, is a mere aggregation of individuals, each with the same aims and impulses and morals as affect other individuals, and that it is their duty to give service, and that people should be lenient of faults and failures the same as the faults and failures of individuals in their daily lives, we would come to a better understanding; and again quoting Mr. Halloran, the question of rates would be the last thing. It is not the question with most people as to whether their bills are more or less than they were. The general feeling of the person purchasing the commodity from a corporation is that he is not getting service. That is the first thing that creates complaint. If he understands the trials and tribulations in that service, he will be very easily satisfied. For the corporation man is no more than a mere merchant, the only difference being that while the corporations are manufacturers they cannot distribute in tin pails or in express packages. If they could do that they would be most popular; but they must, by reason of their character of service, deliver it in a certain way to a consumer, and he knows nothing of the question of the measurement of that supply as he does of the pound of sugar or sack of potatoes, and when it reaches that point where the public understands it, I feel confident that we will have reached that point where there will be satisfied consumers, satisfied employes and satisfied corporation stockholders.

Harnessing of power of the river Nile has been brought to the attention of the British government. The town of Dametta is to be lighted by electricity and power is to be used for silk weaving. Government ownership is being advanced. There is said to be available at Assouan a minimum of 50,000 h.p. One horsepower will manufacture two tons of calcium cyanide in one year, and it is estimated that the Assouan energy could thus turn out 100,000 tons per annum—that is to say, $4,500,000 worth of the fertilizing agent most extensively required in Egypt. Another use the power could be put to is summer irrigation, street lighting and railway operation.

A Canadian hydroelectric fertilizer plant is to be erected by American capitalists on the Saguenay River, water power privileges having been secured from Lake St. John to tidewater in the Province of Quebec. It is said that some 300,000 horsepower is to be developed at an estimated cost, for development of hydroelectric power and construction of plant, amounting to $60 or $70 per horsepower, to be used for the production of phosphoric-acid fertilizer in electric furnaces by heating phosphate rock (Florida pebble) with silica or sand. It is claimed that approximately 3 tons of 45 per cent double superphosphate can be produced per horsepower per annum in the proposed plant.

SELLING ELECTRIC SERVICE

PROPOSED NEW TYPE OF RATE FOR ELECTRIC POWER.

BY FRED O. DOLSON.

The many different types of rates for electric power (and light) now in use by the various power and light companies and the fact that most of the rate schedules are difficult for the consumer to compute or even understand, are reasons why we should all strive to arrive at some simple type of rate which shall be fair to both consumer and the company.

The primary requirement of any fair rate is that the consumer shall pay a rate exactly proportional to the cost of serving him.

As practically all consumers want electricity delivered to their premises at all times, whether they actually use it one hour or twenty-four hours per day, it is here conceded that the service charge of so much per month per horsepower or kilowatt of maximum demand is a fair charge. Whether or not this service charge (sometimes called "Readiness to Serve" charge or "Maintenance and Installation" charge, etc., etc.) should be additional to the kilowatt hour charge or merely absorbed as a consumption charge thus regulating the minimum monthly bill, is beyond the scope of this article and can be handled either way in the proposed type of rate.

Assuming that a fair service charge has been arrived at, the charge per kilowatt hour should be exactly inversely proportional to the load factor. The consumer who ordinarily uses power (or light) only one hour per month is surely not as desirable a customer and is not entitled to as low a rate (even though he pays a service charge) as the customer who uses it eight hours or 24 hours per day and it is here contended that a fair rate to both consumer and company must be lower for each succeeding hour it is used throughout the month.

A rate that meets this requirement is here submitted. (Dolson Rate). "A service charge of $1 per horsepower per month (based on maximum demand) plus a meter rate of two cents per kilowatt hour, with a discount, e.g. (50 per cent times the monthly load factor).

Note: The service charge, two cent rate and 50 per cent base discount in the above were chosen for the purpose of comparison with some existing irrigation rates and may be changed to suit local conditions and different classes of business without affecting the type of rate.

The first advantage claimed for the above rate is that it can be easily explained to the consumer. For example: Say to the consumer, "Your maximum demand is one horsepower and your bill will be one dollar per month service charge, and in addition to this two cents per kilowatt hour as shown by your meter reading. From this amount you will be allowed a discount of fifty per cent if you operate continually; if you operate half the time, your discount will be one-half of fifty or twenty-five per cent while if you only operate one-tenth of the time, your discount will only be one-tenth of the basic discount or five per cent and so forth."

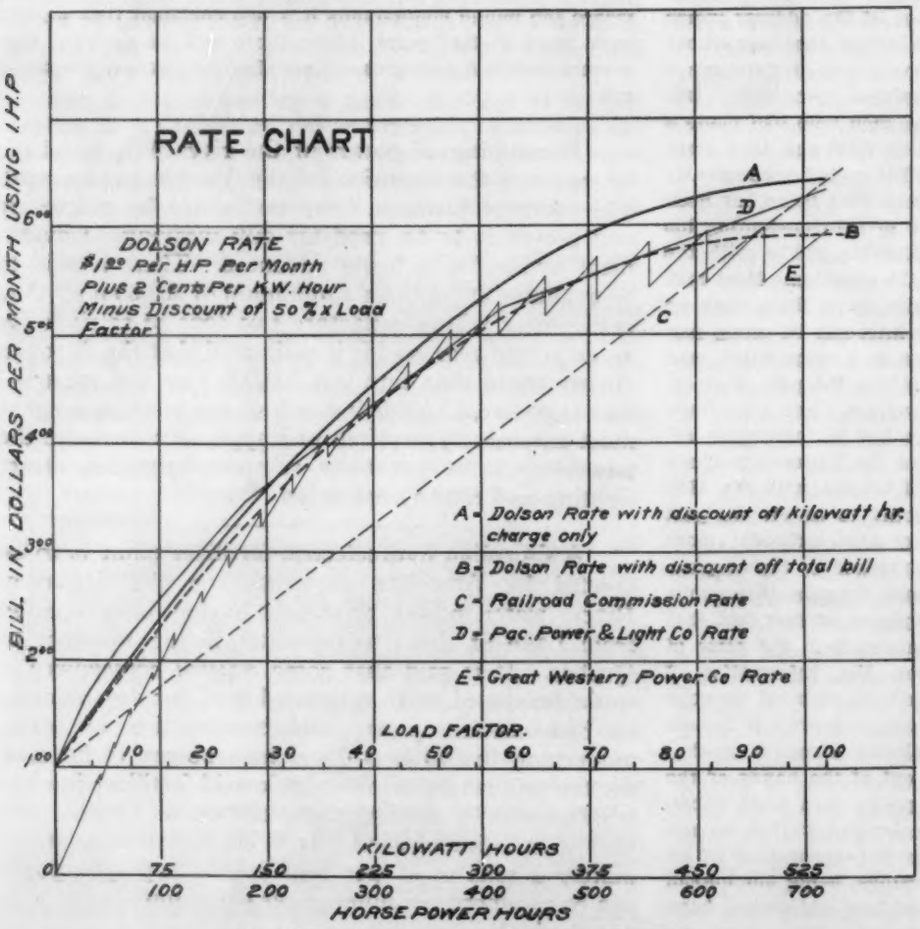

RATE CHART
DOLSON RATE
$1.00 Per H.P. Per Month
Plus 2 Cents Per K.W. Hour
Minus Discount of 50% x Load Factor
BILL IN DOLLARS PER MONTH USING 1 H.P.
A
D
B
E
C
A - Dolson Rate with discount off kilowatt hr. charge only
B - Dolson Rate with discount off total bill
C - Railroad Commission Rate
D - Pac. Power & Light Co Rate
E - Great Western Power Co Rate
LOAD FACTOR.
10 20 30 40 50 60 70 80 90 100
KILOWATT HOURS
75 150 225 300 375 450 525
100 200 300 400 500 600 700
HORSE POWER HOURS

Chart Chowing Comparison of Irrigation Rates.

A comparison of this rate with the rate for irrigation established by the California railroad commission for the Northern California Power Company is interesting, because both rates are the same at zero load factor and the same at 100 per cent load factor; while at 50 per cent load factor the proposed rate is more than $1 higher than the railroad commission rate.

The railroad commission rate reads: "One dollar per horsepower per month service charge, plus one cent per kilowatt hour"; thus making the consumer pay just as much for each succeeding kilowatt hour as for the first. A graphical comparison of these two rates is shown on chart (see curves A and C).

For a second comparison, the agricultural rate of the

Great Western Power Company (as published on page 135 of Journal o Electricity, Power and Gas, issue of Feb. 8, 1913) is used. The Great Western Power Company's rate is a block rate, reducing as the load factor increases and while it results (in the writer's opinion) in a type of rate curve fair to both consumer and company, the changing of rates at certain load factors, instead of a continued gradual reduction, results in a saw tooth rate curve (as shown on chart, see curve E) and makes not only a complicated rate to understand, but one which can be juggled either by the consumer or company. For example: On a one horsepower installation, the consumer looks at his meter and finds he has used 345 kw.-hr. and his bill will be about $5.53. Looking farther down the rate, he finds he can use two kilowatt hours more and actually reduce his bill to $5.20; or he can even use 195 kw.-hr. more (making his total 540 kw.-hr.) and his bill will be only $5.40.

A graphical comparison of the proposed "Dolson" rate and the Great Western Power Company rate is also shown on chart (see curves B and E).

Note: A great many companies use the above described type of block rate apparently for lack of a more suitable rate.

The type of rate now in use which most nearly approaches the ideal, is the Irrigation Power meter rate of the Pacific Power & Light Company of Portland, Ore. This rate is $12 per year service charge, plus a monthly meter rate of

3c per kw.-hr. for first 30 kw.-hr. per rated kw. demand.
2c per kw.-hr. for next 30 kw.-hr. per rated kw. demand.
1½c per kw.-hr. for next 120 kw.-hr. per rated kw. demand.
1c per kw.-hr. for next 240 kw.-hr. per rated kw. demand.
½c per kw.-hr. for balance kw.-hr. per rated kw. demand.

This rate is shown graphically on chart with Dolson rate (see curves B and D) and it will be noted that although the rate reduces at certain points (instead of continually) there can be no sudden reductions or variations in the monthly bill, as in the block rate. The principal objection to this rate is the consumer's difficulty in computing his bill.

The purpose of this article is to call attention to this new type of rate, and the amounts used in examples for service charge, kilowatt hour rate and base discount are not held to be correct for any class of service. A study of the rate proposed will demonstrate that by changing the different factors, the rate curve can be made to conform with almost any equitable rate now in existence. For example: The rate given with 50 per cent base discount applying on both meter rate and service charge, results in rather a sharp curve at load factors above 50 per cent and becomes almost tangent to the horizontal line of the chart at 100 per cent load factor (see curve B).

By reducing the kilowatt hour rate and the base discount, the radius of the rate curve can be made anything between the curve shown and the straight line rise of the railroad commission rate.

Pacific Ocean wireless messages between San Francisco and Honolulu, a distance of 2350 miles are now an every day occurrence, and wireless messages also travel 2100 miles between Lima, Peru, and Para, Brazil.

THE ELECTRIC COOKING OPPORTUNITY.

BY S. J. HALLS.

(The author of this article has had wide experience in developing the electric cooking opportunity and his remarks, conclusions and revenue data herewith are all of value to central station and appliance salesman.—The Editors.)

The careful housewife is ever on the lookout for something new for the home, provided, of course, that the initial cost is within reason and the operating expense likewise.

The rapidly increasing popularity of electrical appliances is making vast changes not only with the manufacturers, who are ever ready to pioneer in developing something more efficient, but with many thousands of housewives who have been able, owing to the many labor saving appliances, to rearrange their duties to great advantage.

The electric range is perhaps the one article which attracts the attention of most ladies, although, for that matter, everyone is more or less interested in the preparation of foods for the family, and with the dependable makes of electric ranges on the market to-day, and the (in most places) reasonable rates charged for energy, it is no wonder that a tremendous increase in electric cooking is taking place. It is a very great mistake to think that electricity for the household, for cooking, washing machine, vacuum cleaner and the many other little appliances, is only for the well-to-do. These, at any rate in this country (British Columbia) usually employ Chinese servants, and a Chinaman, rather than adjust himself to new conditions, would as lief sweat over an old coal stove. It is to the middle classes, and particularly to the housewife who does her own work, that central stations must look, at any rate for the present, for an increase in cooking business. There is no doubt but that many people are these days studying economy, and in this connection electricity stands ready to do its part. To the average housewife the use of electrical appliances means much, being always ready and clean. Cooking with electricity becomes a pleasure rather than a duty, and with careful consideration of the various articles to be cooked is extremely economical.

With this company, up to about five years ago, the electric range was looked upon as something in the nature of a hobby and was never treated as a practical article which would in a very short space of time become installed in hundreds of residences, apartment houses, restaurants, etc., though this has actually taken place.

These results have been accomplished, in the first place, by co-operation with the various electrical stores in the matter of displays and careful advertising, coupled with good service and supervision,

Our average connected cooking consumer is 3.75 kw., with an average maximum demand of 2 kw., and the kilowatt-hour consumption works out at about 90 kw.-hr. monthly, which, at our present rate of 5 cents per kw.-hr., amounts to an average bill of $4.50. In taking chart readings, we find about 79 per cent of the energy used is "off-peak" and 21 per cent comes on our daily peak, our peak period being, roughly from 4 p. m. to 8 p. m. in the winter months and from 7 p. m. to 11 p. m. during the summer months.

ELECTRICAL CONTRACTORS' DEPARTMENT

IS UNDERWRITER'S INSPECTION NECESSARY IN OREGON?

BY F. D. WEBER.

[Concluded.]

As long as the municipal inspection departments are efficient and conduct their inspections on an honest basis and give a "square deal" to all parties interested, the Bureau will put forth every effort to help and aid them. But when they are influenced by "politics," the Bureau immediately assumes an independent position.

The city inspection departments are a great aid in getting the proper installations, when efficiently administered, as they are generally given police power and therefore can get immediate correction, while the Bureau can only make a penalty charge in the rate. Also the immense amount of detailed work necessary to carry on inspection in the residence district should be carried on by the municipality as a "police duty," supported by the money collected by the fee system for inspections or by money out of the general fund, because the Underwriters do not feel that they can afford to do this work without charging for same and if they do charge they have no authority to collect the fees and have no police authority to get enforcement.

(3) For several years the Bureau has made no general reinspection of Portland and only specific cases where the Bureau knew conditions were hazardous, have had their attention.

(4) Outside the city of Portland the Bureau has been making new and complete reinspections of all buildings except dwellings. The methods pursued are as follows:

Form A

Bureau Map — Page 24
Block 127 — Rating 56
Sheet 33 — Class A
Map No. 1 — Index 98

UNDERWRITERS' EQUITABLE RATING BUREAU
819 SHERLOCK BUILDING
PORTLAND, OREGON

ELECTRICAL INSPECTION REPORT (WHEN ANSWERING REFER TO INDEX)

Mr. C.F. Smith,
Marshfield, Oregon.

Portland, Oregon,
March 1, 1914.

Dear Sir:-

Under certain circumstances an electrical defect must cause fire. This fact being well established, we feel that it is only necessary to call your attention to the following described electrical defects in order that they may be remedied. May we rely on you to notify us within a reasonable time from receipt of this letter that the defects have been corrected and made to conform to the requirements of the last edition National Electrical Code? Defects noted below have been reported as existing in the electrical equipment of your property by our Electrical Inspector in his report April 26th, 1913.

Jas. H. McCune, Secretary

City Marshfield, Owner Mr. C. F. Smith

Street 254 Main Street

Between Grant and Front Sts.,

Building Warehouse Occupants

☞ The Deficiencies noted by number at bottom of page refer to index on other side and enclosed sheet.

FILL OUT BELOW WHEN DEFICIENCIES ARE CORRECTED AND HAVE SAME PROPERLY DATED AND SIGNED AND MAIL ENTIRE SHEET TO UNDERWRITERS' EQUITABLE RATING BUREAU
P. O. BOX 749, PORTLAND, OREGON

CERTIFICATE OF CORRECTION

Marshfield, May 1st, 1913

This is to certify that the defects referred to above have been corrected as follows,

The defects in warehouse have been properly corrected.

(Signature) W. F. Powell,
Electrical Inspector.

NOTE—This certificate must be signed by the City Electrical Inspector in the city in which the risk is located, and in the absence of such an official, by some official of Electric Light Company, or Electrical Contractor who made the installation or corrected same, before being accepted by this Bureau, and is accepted only pending re-inspection by a regular Electrical Inspector of this Bureau.

DEFECTS. Warehouse:- 230:: 60 : 10.

Electrical Inspection Report; Form A.

(b) Notice sent owners and tenants.

(See Form letter "A" which is filled out and sent to owners and tenants of the risks inspected. The defects being

(a) Inspector goes through all the buildings.

referred to by number. Form "G" being enclosed which gives the key to the numbers at the bottom of Form letter "A." At the bottom of Form letter "A" is a "certificate of correction" which the properly authorized parties can fill out and sign when defects are corrected.)

(c) Reinspection made to see if certificate of inspection in (b) has been honestly done.

(d) Report printed on city or town and sent to managers of all companies. (See Report No. 31, Oregon City.)

(e) A second notice sent.

(f) If a municipal inspection department exists in the city where the inspection is made the Bureau endeavors to get them to condemn the defective installation in the buildings, or parts of same in question, and get correction by that means.

(g) Finally failing to get correction, the Bureau adjusts the insurance rate 5 to 25 per cent as the hazard may demand.

JAMES H. McCUNE, Secretary
P. O. Box 749

TELEPHONES: Main 139
A 6267

UNDERWRITERS' EQUITABLE RATING BUREAU
819 SHERLOCK BUILDING
PORTLAND, OREGON

INDEX OF DEFICIENCIES

ADJUSTERS:
1. Unapproved cord adjusters.

ATTICS:
10. Attics not properly bored and bushed.
11. Attic inaccessible.

BOXES:
20. Lids not placed on outlet boxes.
21. Outlet boxes loose.

CONDUIT:
30. Approved rigid or flexible conduit not used.
31. Conduit not locked to cabinet (a) or fittings.
32. Conduit not properly grounded.
33. Couplings not installed on conduit.
34. Service conduit not entered in main line cutout or into cabinet if same is required.
38. Conduit installed without approved fittings.

CORDS:
50. Cord not stranded.
51. Cords too long (a) or fixed other than as pendants.
52. Cords in show windows are prohibited.
53. Lamp cords in bed chairs (a) or hung on metal hooks, nails or grounded materials, (b) or run through partitions.
54. Pendant cords not terminated with loose paper or knots.
55. Portable lamps, (a) motors, (b) fans, or (c) fixtures not connected through reinforced cord.
56. More than one cord in a rosette.
57. Pendant cords without knots in fittings.
58. Pendant cord attached to circuits without approved fittings.
59. Unapproved cord adjusters.
60. Cord circuits.
61. For pendant cords to wet or dusty places, use stranded bronzery cord or packing house cord soldered direct to circuits, but supported below rosettes; also, weather-proof sockets must be used.
62. Two or more lamps on one cord with approved fittings.
63. Cord used for outside wiring not approved.

CLEATS:
100. Three-wire cleats are prohibited.
101. Wood cleats, staples or nails as insulators prohibited.
102. Cleats should not be concealed.
103. Cleats used on outside of building.

CABINETS:
110. Cabinets not properly made (a) or lined.
111. No doors on cabinets.
112. Cabinet doors not lined.
113. Wooden cabinets used with iron conduit.
114. Cabinet inaccessible.
115. Cabinet not dry inside.
116. Cabinet not approved by N. E. C.
117. Cabinets of approved types must be installed to contain service switch and cutouts, (a) lightning cutouts, (b) power cutouts, (c) fuses protecting motors, (d) instruments.

CABINETS, STEEL OR IRON:
118. This Bureau will not sanction the installation of any steel or iron cabinets except those bearing the Underwriters' Label or those approved by them. (See last edition, List of Approved Electrical Fittings.)

CIRCUITS:
120. Circuits overloaded.
121. Circuits overfused.
122. Circuits with more than 16 outlets approved only on written promise that current shall not exceed 660 watts.

INDEX OF DEFICIENCIES—Cont'd

FITTINGS:
130. Broken fittings.
131. Fittings loose from support.
132. Unapproved fittings (as snap switch).
133. Improper use made of approved forms of fittings.
134. No support provided for fittings.

FUSES:
140. Unapproved (a) or improper use of open link fuse blocks.
141. Too many lights dependent on final fuse block.
142. Cartridge fuse block bridged with string fuse or wire.
143. Improper fuse block (a) or none at entrance.
144. Arc lamps not fused individually.
145. Fuse blocks located over or near telephone switches.
146. 125-volt fuses on 220-volt circuits.
147. Fuses too large to protect circuit.
148. Refilled (a) or (reinforced) fuses.

FLEXIBLE TUBING:
170. Flexible tubing too short at outlets.
171. Flexible tubing used through floors or in damp places.
172. Service wire bushed with flexible tubing; must be porcelain or conduit
173. Where splices are not moored 5 inches, splices must be separately enclosed in continuous flexible tubing.
174. Porcelain and flexible tubing out of place.

FEEDERS:
200. Feeders overloaded.

FIXTURES:
210. Electric fixtures not properly installed.
211. Fixtures canopies on top of circuit wires or pendant switch wires.
212. Not properly insulated.
213. Chain fixtures in show windows are prohibited.

GROUNDING LOW-POTENTIAL CIRCUITS:
220. Low potential circuits not properly grounded on the direct current three-wire system, (a) alternating current secondary system.
221. Ground connections not made according to N. E. C. rules and requirements of N. E. C.

HEATERS:
230. Electric iron improperly installed.

HAZARDOUS:
250. Installation in such a hazardous condition that same should be completely re-wired.

INSULATORS:
260. Improper canopy insulator (a) or none preventing contact between canopy and steel ceiling, gas pipe or grounded surfaces.
261. Cross-over tubes or insulators not properly fastened to plates.

JOINTS:
270. Joints not soldered, (a) or taped, (b) or properly made.
271. No rubber tape on joints.

LAMPS:
280. Lamps hanging against woodwork.
281. Open arc lamps inside of building.
282. Miniature light wiring not approved.
283. Lamps must be equipped with approved lamp guards.

LIGHTS:
290. Dead or loose connections at fuse blocks and switches.
291. Knobless loops.

LOCKS:
300. No terminal lugs used.

INDEX OF DEFICIENCIES—Cont'd

TROLLEY CURRENT:
450. Current for motor (a) or lights taken from trolley current.
451. Current for motors (a) or lights taken from trolley bus.

THEATRES AND MOVING PICTURE ESTABLISHMENTS:
460. Theatre and moving picture establishment, (a) dressing room, (b) auditorium, (c) stage, (d) lofts, not installed in approved conduit.
462. Moving picture theatre not installed according to standard specifications.
465. Service not according to rules and requirements of National Electrical Code.
466. Footlights, (a) borders, (b) proscenium side lights, (c) floats, (d) irons, (e) strain lights, (f) portable equipment, (g) switch board, (h) stage pockets, not installed or constructed according to the National Electrical Code.

TRANSFORMERS:
480. Bell ringing transformers not properly mounted (a) or not of approved make.
482. Sign transformer not properly mounted (a) or not of approved make.
483. Transformer cases not thoroughly grounded.

WIRE:
490. Wires of opposite polarity in contact (a) or too close together.
491. Service disconnected, but live wires still attached to building.
492. Wires not insulated at entrance.

INDEX OF DEFICIENCIES—Cont'd

493. Wires against or too close to grounded pipes, or improperly protected.
494. Wires not protected where liable to mechanical injury.
495. Wires in contact with outside awning (a) or with metal front or side of building.
496. Telephone or signal wires in contact with (a) or too close to light or power wires.
497. Wires not bushed (a) or bushed improperly through walls, floor or partitions.
498. Wires of opposite polarity through one hole.
499. Wires too small for current carried.
500. Wires not attached rigidly to cutouts (a) or knobs from support.
501. Other than rubber covered wire used for concealed work.
502. Wires not properly separated in concealed work.
505. Wires not supported at sufficiently frequent intervals.
506. Solid wires used as conductors to swinging or movable lamps.
508. Wires not entering conduit properly at cabinets from knob and tube to conduit work.
509. No fuse used wherever change is made in size of wire.
507. Service wires in bad shape or not properly attached to or insulated from building.
508. Wires in contact with other materials than insulators.

INDEX OF DEFICIENCIES—Cont'd

MOULDING:
510. Moulding not properly mitred (a) or painted, (b) or used in damp places.
507. Moulding without capping.
512. Moulding run on grounded surfaces without backing.
513. Soft wood moulding used instead of hard wood moulding.
514. Moulding installed without inplets.
515. Concealed moulding.

MOTORS:
520. Motor overfused.
521. Motor should be enclosed.
522. High potential motor frames not grounded, (a) terminals, (b) ends of the lead covered cable.
523. High potential motor not installed according to National Electrical Code.
524. Motor base frames not properly grounded, (a) not thoroughly installed.

OUTLETS:
540. Outlets not in use should be thoroughly taped up.

OUTLINE LIGHTING:
545. Method of installing "outline lighting" not approved by National Electrical Code.

PROTECTORS:
550. No protector (a) or lightning protector at entrance on telephone or signal wires, (b) or protector improperly located.

RECEPTACLES:
560. Lamp receptacles with exposed tops or contacts in show window.
561. No sub-base under snap switch (a) or receptacles.
562. Unapproved receptacles.

ROSETTES:
570. Unapproved rosettes.

RHEOSTATS:
580. Rheostat not properly mounted.

SIGNAL SYSTEMS:
585. Signal system not installed according to the National Electrical Code.

SWITCHES:
590. Improper switch (a) or fuses on fan or motor circuits.
591. Improper switch (a) or fuses at entrance panel.
592. Entrance switch improperly located (a) or not readily accessible.
593. Entrance switch (a) or fuse on house side of main.
594. Knife switch inverted (a) or located on line side of entrance fuse.
595. 110-volt switch on 220-volt circuit.
596. No cut-out under snap switch (a) or receptacles.
597. Switch and cutout must be guarded by approved cabinet.
598. Main service switch and fuse not far from the entrance of service wires to building.
599. Meter switch and cutout must be placed in cabinet.

SIGNS:
600. Electric signs not constructed and installed according to National Electrical Code.
601. Sign circuits must be installed in approved manner from cabinet.

SOCKETS:
630. Lamp sockets not bushed.
631. Keyless sockets used instead of keyless sockets.

SWITCH BOARDS:
640. Not constructed of slate, marble or approved other equivalent prior to 1912 asbestos board.
641. No approved ground detector.

INDEX OF DEFICIENCIES—Cont'd

660. Unapproved wire.
611. Overfused wire.
612. Wires not properly supported over roofs.
613. Wires in open work not properly secured.
614. Wires held in place by tie wires on sizes smaller than No. 8 B. & S. gage.
615. Bare wire.
616. Wires bushed (a) or clamped over horizontal surfaces.
617. Dead circuits and wires should be removed.
618. Clamped (a) or knobbed over grounded materials.
620. Wires inside of cabinets should be neatly combed.
630. Wires must enter cabinet through openings made for that purpose only.
625. Wires should be kept free of dust accumulations in saw mills, wood mills and similar places.
630. Two wires on one single-wire knob or cleat.
635. Wires run without insulating supports such as knobs, cleats or tubing.

WIRELESS TELEGRAPH:
660. Not properly installed according to requirements of National Electrical Code.

MISCELLANEOUS:
700. Inspector was refused permission to enter the

NOTE—Example to illustrate use of above: Given defect, "600." This should read, "Wires of opposite polarity in contact." Had given defect been "600a" this should then be read, "Wires of opposite polarity too close together."

Form G—Key to Numbers Used on Reports.

The Bureau's efforts are not always taken in the same spirit in which they are given, as shown in the following letter from a property owner:

Dear Sirs:—As you have called me down twice for something that is not true, I will now advise you, you better employ men that have a little brains or have eyes that can see straight. I did have paper around the wire before you notified me first, but I took it off, so remind your man to look closer after this.

Gentlemen:—This defect No. 507 is all Greek to me and I am no mind-reader. If you want anybody to understand any of that dope you will have to send some key. It seems very queer that one year you are wired all O. K. and next year you are all wrong, just because there is some new junk on the market that seems better. Something is rotten.

Very resp.

To aid in this work it is necessary that the electrical contractors and workmen know the rules and requirements of the National Electrical Code. Few "laymen" can take the standard notice and understand same, therefore, it is necessary to educate the electrical contractor in many cases, which the Bureau is always willing to do if he will signify his desire to be taught.

Also the inspection department of the Bureau must maintain a consistent system of rulings and interpretations of the National Electrical Code and all persons interested in electrical installation work must be systematically advised of any change of rulings, interpretation or new rules adopted by the electrical department of this Bureau.

Therefore, there is issued annually in pamphlet form an Addenda to the National Electrical Code. Between editions of the Addenda, if it is necessary to advise the parties interested on points not covered in the National Electrical Code and Addenda, circular letters are issued which are sent to all parties on our mailing list.

Tables 3 and 4 show the work done in Oregon cities outside of Portland, during the past two years.

TABLE 3.

First Inspection.	Date.	A Total No. of Bldgs., Passable.	N Notices not sent, No wiring, disconnection locked.	J Total number of original notices sent.	K Total number of inspections.	Percentage of risks passable.
St. Johns	Feb. 13-15-20, 1912.	1	6	59	66	1.5
Gresham	Feb. 28-29, 1912...	0	1	38	39	0
Hillsboro	Apr. 9-10-12, 1912.	1	11	69	81	1.2
Pendleton	June 3-9, 1912....	15	5	94	144	3.4
Ashland	May 8-9, 1912.....	12	9	70	91	13.2
Medford	May 8-9-13-14-15, 1912	22	14	91	127	17.3
Grants Pass	May 5-6, 1912.....	12	22	75	109	11
Roseburg	May 2-5, 1912.....	19	4	64	87	21.9
Cottage Grove	Aug. 9-10, 1912....	10	1	42	53	18.8
Eugene	Apr. 25-May 2, 1912	4	17	160	181	2.2
Albany	Aug. 12-14, 1912..	25	16	99	130	19.2
Salem	Mar. 14, Apr. 8, '13	69	22	107	198	34.9
Astoria	May 5-12, 1913....	61	54	162	277	22
Hood River	June 2-3, 1913....	50	3	8	61	82
The Dalles	June 9-13, 1913...	32	4	35	71	45
Marshfield	July 30-Aug 1, 1912	20	8	68	96	20.9
Coquille	Aug. 6-7, 1912.....	9	7	41	57	15.8
Bandon	Aug. 5-6, 1912.....	11	2	45	58	18.9
Myrtle Point	Aug. 7-8, 1912.....	3	9	30	42	7.1
North Bend	Aug. 4, 1912.....	12	7	27	46	26.1
Oregon City	July 10-16, 1913...	17	11	64	92	18.4
Corvallis	Aug. 5-8, 1913.....	18	12	67	97	18.5
Independence	Aug. 9-10, 1913....	5	1	24	30	16.6
McMinnville	Aug. 11-15-18, 1913	9	5	44	58	15.5
Newberg	Aug. 16-20, 1913...	17	19	64	100	17
Klamath Falls	Sept. 6-11, 1913....	52	31	55	136	38.2
Jacksonville	Sept. 15, 1913.....	20	10	7	37	54.2
Oakland	Sept. 27, 1913.....	13	13	10	36	36.1
Gold Hill	Sept. 16, 1913.....	10	7	19	36	27.7
Dallas	Nov. 19-20, 1913....	33	4	34	71	46.5
Forest Grove	Nov. 21-22, 1913...	14	8	29	52	26.9
Lebanon	Nov. 11-12, 1913...	20	11	27	58	34.5
Totals		616	354	1902	2727	

Some of the following reasons have made the electrical contracting business far from perfect and consequently a source of trouble to the inspection department:

TABLE 4.

First reinspection.	Date.	B No. of certs. returned O. K.	C No. of certs. returned on R. I.	D No. of cor. no cert. returned.	E No. of bldgs., rates inc. prev.	F No. of bldgs., reduced prev. inc.	G No. bldg., burned and removed.	H No. of bldgs., rates increased.	I No. of bldgs., time extended.	L Percentage of bldgs., corrected that were originally insp. after 1st reinsp.	M Percentage of bldgs., passable that were originally insp. after 1st reinsp.
St. Johns	Oct. 3, 1912.....	19	..	18	..	..	..	19	4	62.7	63.3
Gresham	Oct. 11, 1912.....	15	10	2	..	..	..	15	19	18	18.4
Hillsboro	Oct. 18-21, 1912....	4	3	4	..	..	..	49	8	7.2	8.7
Pendleton	Oct. 23-26, 1912....	3	..	3	8	..	..	..	70	6.4	19.2
Ashland	Oct. 8, 1912.....	31	5	2	5	..	..	..	30	40	48.7
Medford	Oct. 9-11, 1912.....	17	3	7	3	..	..	..	65	23	38
Grants Pass	Oct. 13, 1912.....	36	8	11	3	3	..	..	97	52	57.4
Roseburg	Nov. 14-15, 1912...	15	4	5	10	5	1	..	52	23.8	40.9
Cottage Grove	Nov. 16, 1912.....	9	1	2	19	2	..	..	14	23.8	38.4
Eugene	Nov. 18-19-20, 1912.	67	3	2	19	4	1	..	73	40.8	42.3
Albany	Nov. 21-23, 1912....	26	..	..	12	0	4	..	61	23.1	39.1
*Salem	July 1-2, 1913.....	22	9	..	15	1	1	4	62	11.3	45.3
	Jan. 21, 1914.....										
Astoria											
Hood River											
The Dalles											
Marshfield	Sept. 20, 1913.....	25	..	7	5	2	2	4	30	45.4	58.1
North Bend	Sept. 19, 1913.....	7	..	..	1	..	..	..	18	25.9	48.7
Bandon	Sept. 22, 1913.....	14	1	9	..	..	..	..	22	48.8	71.7
Coquille	Sept. 24, 1913.....	3	..	5	2	..	2	2	32	15.4	32.4
Myrtle Point	Sept. 24, 1913.....	7	..	2	1	..	..	1	22	30	36.3
Oregon City	Jan. 16, 1913.....	16	..	16	13	..	..	..	39	50	32

*No report made until after second reinspection.

Formulae. $$L = \frac{(B + C) + D - G}{J - G}$$

$$M = \frac{A + (B - C) + D - G}{A + J - G}$$

1. Attractiveness of the business to amateurs.
2. Carelessness and ignorance among workmen.
3. Indefinite specifications furnished by architects.
4. General disposition of public to desire cheapness.
5. Competition among the contractors themselves—"cut-throat methods."
6. "Carpet bag" competition.
7. No state restriction as to license restrictions for contractors.
8. Lack of experience within the ranks of the contractors.
9. Faulty or incorrect inspections by inspectors.
10. Lack of co-operation among contractors.
11. The rapid changes taking place in the science of electricity.
12. Lack of co-operation between architects and contractors.
13. Lack of co-operation between the jobbing trade and the electrical contractors as regards price protection.
14. Ignorance on the part of a high percentage of the electrical contractors as regards plain business methods and how to figure their legitimate profits.
15. Lack of pride in their work and business.
16. Lack of proper co-operation between central station and contractor.
17. Competition between the jobber, central stations and the electrical contractor—a family divided among themselves.

In connection with electrical construction outside of buildings, this Bureau looks to the Railway Commission of Oregon, to handle same, except in the case of fire alarm systems and specific cases where buildings are unnecessarily exposed. In some of the cities "outside electrical" ordinances are in effect and they take precedence over the railway commission's rules.

(6) The inspection department endeavors to impress upon municipal water departments and privately owned water systems used for municipal purposes the necessity of making careful electrolytic surveys, as a preventative measure in order to guard against the terrible catastrophies which might follow if municipalities are left without a water supply for domestic and fire protection. Very few cities in Oregon have more than one supply of water supplied through an iron or steel pipe, and their reservoir storage facilities are limited. Therefore, the very serious condition which might obtain if electrolysis should attack the only available source of supply. We are not aware that these suggestions have been heeded and that any of the above departments have done more than a very limited amount of investigation.

The influence of the Underwriters' electrical inspection and the National Electrical Code on the "fire loss," is borne out by all statistics on the subject and this paper has shown the methods that are employed in order to produce this efficiency.

There are five (5) large cities in the United States, Philadelphia, St. Louis, Cincinnati, Baltimore, Buffalo and Milwaukee, which do not maintain separate city departments, authority being given to the Underwriters to make electrical inspections. Doubtless this method can be made the most efficient inspection known, as politics are eliminated and the Underwriters from their broad scope of operations and connections occupy an ideal position to act in this capacity.

In this age in which every one is striving for efficiency and the betterment of humanity, the public conscience has not yet been fully aroused to the crying need of a national movement to guard against fire waste.

It has been many times estimated that 90 per cent of the fires in the United States are from causes which could be prevented. Therefore, if fire prevention were taught in our public schools and the public properly educated, we would awaken the great American public to their thoughtless waste of wealth and resources.

By the "Oregonian" of February 19th, the writer notes that Superintendent of Public Instruction Churchill is providing for lessons on "fire protection." The pamphlet is comprehensive, giving the laws relating to fire prevention and regulation for school buildings.

"All teachers," says the pamphlet, "of public and private schools are required to have at least one fire drill each month in schools having an average daily attendance of fifty or more pupils; are required to instruct all pupils between the ages of six and fourteen in the dangers of fires, and to devote not less than thirty minutes each month to such instruction."

In the life of many present, we will see the U. S. Government take over the work of the Underwriters' Laboratories Inc., under the Bureau of Standards in Washington, D. C., also every state in this union will maintain a State Electrical Inspection Bureau under the general supervision of the U. S. Government and "bad electrical conditions" will be placed under the ban of the law and treated the same as "contagious diseases."

Under the guidance of the federal and state government we shall truly have "Safety First," and be compelled to "Let the Code Decide."

California electric street railways, for the year ending June 30, 1912, were operating on 2543 miles of track, carried 631,553,486 passengers with a gross revenue of $33,711,737. They operated 4938 cars, employed 16,510 employes and had only 80 fatal accidents with passengers, 14 employes and 38 other persons being killed. The total operating expenses were $20,413,317 of which $5,420,798 was spent for structure and equipment. These figures do not include the suburban electric system of the Southern Pacific Company in Alameda county and the Northwestern Pacific Railway in Marin county.

Amounts to be expended on reclamation by the Federal government during 1914 include the sum total of $21,383,412.30 for western projects in the states of Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington and Wyoming. The amounts to be expended on the various features is limited and no transfer of funds will be permitted between features except after specific approval of Secretary Lane, and then only after detailed and itemized statements have been made by the projects showing the necessity or desirability for such transfers. According to the Reclamation Record, the plans are based upon certain assumptions and upon the conditions existing at the beginning of the year; therefore, it should be borne in mind by the water users that unforeseen conditions may materially change the operations as proposed.

CALIFORNIA ASSOCIATION OF ELECTRICAL INSPECTORS

Section of N. A. E. I.

C. W. Mitchell, President. Arthur Kempston.
Wm. G. Pennycook, Vice-Pres. B. C. Hill, Executive Comm.
John W. Carrell Secretary-Treasurer, 55 Fulton, San Francisco.

The purpose of this organization is to standardize the common practice in electrical construction with the National Code as the general standard.

Questions pertaining to electrical construction will be answered in these columns, but only from the point of view of the Code. This is a voluntary organization and the answers published under this heading must not be construed as authoritative, or binding. No attempt will be made to correllate the answer from the several Inspection Districts, as an occasional difference of opinion will tend to induce further study on subjects. All questions will be passed upon by an executive committee.

Address all communications to the secretary.

MAIN SERVICE WIRING FOR BUILDINGS—LOW VOLTAGE SYSTEMS.

By the Secretary.

Protection is the first rule of electrical construction, i.e. protection from fire and life hazards; protection by adequate insulation, by automatic safety cutouts and by mechanical arrangement. Of more importance than any other feature of installation, is the protection of main service wires, because, in addition to other things, they transmit current for the full load, however distributed in the branch circuits; because they are not, as a rule, protected by cutouts on the supply side of the main service cutout; because accidental crosses from high potential lines or leakage from transformers may cause high voltage to enter the building over these wires, in quantity or as sneak currents. To have as little wire within the building as practicable unprotected by safety fuses and to have these fuses in a place which will permit of easy access is the purpose of the National Code. The location of the main service fuses, therefore, is the most important point in main service wiring.

The general rule for the protection by fuses of all wires (other than those of branch circuits) is as follows: Automatic cutouts (safety fuses) must be placed on all wires, either overhead or underground, in the nearest readily accessible place to the point where the wires enter the building and inside the walls, and arranged to cut off the entire current from the building; must be placed at every point where a change is made in the size of the wire (unless the fuses in the larger wire will protect the smaller); must not exceed in rated capacity the allowable carrying capacity of the wire (Table No. 18, N. E. Code); must be in plain sight or enclosed in an approved cabinet and readily accessible.

To secure fuse protection for service wires in the supply system outside of the building would be ideal and the idea is continually advanced, but like many things which are ideal such protection is not very feasible. In general the only cutouts in the supply system are in the individual leads of the generators or transformers, as the case may be; many generators may be connected in multiple and for electrical and commercial reasons transformer secondaries are often banked.

In so far as service wiring is concerned buildings may be divided into four classes; as (1) those supplied from underground systems and having accessible basements; as (2) those supplied from underground systems and without basements; as (3) those supplied from overhead systems with the service wires installed underground; as (4) those supplied from pole lines by wires extending overhead to the outer wall and thence to the main service cutout.

In the first case the entrance fuses may usually be placed at or near that point where the underground tube projects through the basement wall. In the second case the most practical method is to bring the wires through the floor in conduit, with the shortest possible unprotected run, and to place the service fuses at the point of entrance. For service entrance from underground systems the general provisions are as follows: Underground conductors must be protected against moisture and mechanical injury where brought into a building and all combustible material must be kept from the immediate vicinity; must have tubes through which they enter tightly closed with asphaltum or other non-conductor, to prevent gases from entering the building through such channels; must not, if from a subway, supply more than one building.

In the third case it is common practice to install lead covered wires from the pole line to the fuses. Electrical trade conduit or punched and reamed pipe is used to enclose these wires, the tube projecting from the ground immediately under the location of the fuses.

The fourth case, the strictly overhead service, presents a more varied and difficult problem.

The service wires may enter the building through a single iron conduit. The conduit to be equipped with an approved service head.

Where the outer vertical enclosing wall of a building is fire-proof, the conduit may be embedded in the concrete or masonry and the service fuses located at a point at the first floor, such as in a tradesmen's entrance. Where the outer wall is not fire-proof (by a ruling of the Board of Fire Underwriters of the Pacific, 1910) the conduit must be run exposed on the outside of the wall to the location of the fuses, the run not to exceed a wiring distance of thirty feet. However the wires enclosed in conduit may be concealed in non-fireproof walls and the purpose of the code accomplished in an other way, i.e.—the conduit to terminate in an approved service hood located near a window of the second story and enclosing the service fuses. The hood to be installed in a manner which will permit easy inspection or replacement of the fuses. The rule would then be deemed complied with even though the literal requirement is that the fuses must be inside the walls. Ground connections for main service conduits (required by Rule 28 f, N. E. Code) should be protected from corrosion by a heavy coating of approved rust preventive. The other method is to locate the service fuses inside the building at the point where the wires actually enter the walls (as near as possible) even though this may mean a place within an upper story.

The grounding of the neutral wire of a three wire system might be well considered here, but that will be another story for a future issue.

The wireless range of shore stations is an important matter to be considered when attempting to send messages to persons on shipboard. There is no way of arriving at an average range for the stations on the Atlantic or Pacific coasts that would be reliable as the range varies so much with changing climatic and other conditions. Messages are sent much more easily at night than in the daytime and in winter than in summer, and the range under favorable conditions at midnight during midwinter is said to be several hundred per cent better than at noon in midsummer. Each station has a normal range assigned to it, and this range is set forth not only for the coast stations, but for those on every ship equipped with wireless as well, in the bulletins of the International Bureau at Berne. These normal ranges are given in most cases from 100 to 400 nautical miles, but some are lower and several higher than this. The range of ship stations is ordinarily from 100 to 200 miles.

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POWER AND GAS

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PACIFIC LUMBERMAN, CONTRACTOR AND ELECTRICIAN

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Twenty years ago Western business was at low ebb. The boom of 1887 had burst and the blight of 1893 had fallen upon the entire country. Heroic measures were necessary.

Lest We Forget

A few courageous men of vision rose to the emergency. By their indomitable energy and unbounded enthusiasm they fired the faith of Eastern investors in the integrity of the West and the great natural resources with which nature had endowed it. They expended their creative ability in constructive endeavor, poured forth money unstintingly, and built up a prosperity unparalleled in the world's history.

Consider the facts of the electrical growth alone. Power was transmitted at undreamed of voltages over unheard of distances. Its abundance and cheapness made new industries possible, and today this handful of people on the Pacific slope are pre-eminent in the use of electricity, the greatest civilizing agent the world has known. One seventeenth of this country's population is using nearly one-fourth of the entire generating capacity, and contributing one-seventh the aggregate income of the electric lighting industry. On an average, every person in the West uses 527 kw. hours yearly, and pays $7.50 for light and power, as compared to the 99 kw.-hour consumption and the $3 contribution of the population East of the Rockies.

Sensationalism is now trying to stir up public sentiment against the men who have done these things: men who made possible the transportation, light and power facilities, upon which city growth is so dependent, this being done long before these utilities were commercially profitable. Many of these proposals amount to virtual confiscation of property, in order that politicians may ride into office on the hobby of public ownership.

An Appeal to Reason

While several examples might be cited, these remarks are particularly applicable to Los Angeles at present. Although this city has already been bonded for over $35,000,000, most of which has been expended upon the Los Angeles aqueduct, another issue of $6,500,000 is to be voted upon next week. Of this, one issue calls for $1,250,000, to complete the hydroelectric power plants for which $3,500,000 was voted in 1910, and another calls for $5,250,000 to build or acquire a power distributing system. Other bonds aggregating $30,000,000, with these, are also under consideration for water, sewer, park and harbor improvements. Some difference of opinion exists as to the limit of bonded indebtedness which the city may yet assume, but the most extreme estimate is slightly in excess of $20,000,000, which shows how close to the danger line the city is steering in bonding itself for duplicate electric utilities now supplied by private enterprise.

The average citizen does not realize that public utilities are as important an asset to his city as they are to the owners, and that if improvements are to be made, the investment must be attractive instead of repulsive to capital. The safety of any investment does not lie in its special class, whether municipal, industrial or public utility, but in the security back of it Each new municipal bond issue weakens the security and the credit of a community, so that when it is

necessary to raise money for needed conveniences, cities may have as much difficulty in borrowing as do individuals.

It is also hard for non-property owners to understand that they pay their share of this tax for bonding. Taxes increase the cost of production, the cost of distribution, the cost of doing business, and the scale of rents. The wage-earner, who has been brought up in the belief that only the rich pay the taxes, really pays indirectly a larger part of his income than those who pay direct money to the tax collector. Under municipal ownership of public utilities, the municipality pays no taxes, and consequently the added burden must be borne by the citizens instead. Higher taxes follow bonds as surely as death follows life.

Furthermore, there is no immediate necessity for issuing these bonds for the distribution system, as the electric companies have offered either to buy the aqueduct power or to lease their distributing lines to the city. In either case, the rates would be fixed by the state railroad commission, and the municipality would be in a position to sell power at an assured income instead of bonds at an assured outgo.

Finally if this calm statement of fact does not appeal to the reason of the citizen, his sense of loyalty should certainly cause him to vote against such bonds. Loyalty above all else cannot be one-sided. It is as necessary for the West to be loyal to capital as for capital to be loyal to the West. Are they loyal to those who have made possible these many advantages when property is depreciated? Are they helping those who have helped them? While municipal ownership may be inevitable, should it not be accomplished by evolution instead of revolution? If no other argument prevails, reason and sentiment would both dictate that gratitude—cynically defined as "a lively appreciation of favors yet to come"—compel the defeat of these bonds.

Gratitude Remembers

Though underground and out of sight, invention and applied invention—which is progress—have not ignored the mines. This was emphasized at the recent meeting of the electrical section of the Nevada Industrial Safety Conference, held at Reno, Nevada, during the past week, when the subject of electric mine haulage was discussed from many different viewpoints.

Safety First in Mine Haulage

Haulage in mines has differed widely in but a comparatively short period as to the means of propulsion employed, but improvements have latterly been along the line of the method of utilizing electricity for that purpose.

In Justin McCarthy's "History of Our Own Times," the author describes how that less than seventy-five years since, women were employed in the mines of "Merrie England" for the purpose of hauling cars; their harness a chain passed between trousered legs and fastened to the bare waist. These women lived lives of degradation, and legislation soon compelled the use of ponies in their stead. Born in the mines, and not knowing the light, these ponies were blind.

To-day mine haulage in this country is by mules or by the still more modern use of compressed air or electricity, and the tunnels are often well illuminated with diffuse electric light.

This is the short history of there and here and of changed conditions in but a few years.

And electricity, the last in adoption, has become first in safety.

It is more efficient and more humane than the old English method, and is naturally cleaner and more reliable than the mule, over which a saving is shown in one stated instance, of no less than one-third.

Before electricity has entirely displaced the mule, some progressive companies are already changing their existing and comparatively new electrical systems to others considered by them more advantageous, economical and safe.

For, like the mule, electricity has a kick if not used rightly.

The object of the meeting was to aid in the determination of correct practice in electric mine haulage.

Custom, age of installation and preference, are factors conducive to variation and one of the important points brought out is that there is at present no standard practice.

Those best informed on these matters are apparently not sufficiently well informed as to the scope, possibilities and types of apparatus available. For example, opposite opinions were expressed as to the advantages of alternating and direct current systems and apparatus, which condition manufacturers would do well to consider.

One important development was that safety is largely a matter of efficiency for an item as seemingly remote as the best type of car bearing might make available the means of more safe mine operation—that is to say, of fewer accidents and in electric mine haulage, Safety First.

Opportunity is usually considered a circumstance; a favorable or advantageous season; or, in a word, something closely akin to chance. But there is a different definition which rightly removes the element of chance or uncertainty—one which is more just—and although it has not yet found its way into the dictionaries, is none the less correct:

Opportunity Defined

Opportunity consists in the improvement of human service, conditions, or environment.

This definition, instead of allowing you to rust while waiting for opportunity to turn up, urges you to brighten up while evolving opportunities. It calls for preparation, vigilance, tact, and a daring aggressiveness which will carry proposed projects through to a successful issue.

You cannot improve that about which you know nothing. Other things being equal then, they have most opportunity who possess the most useful knowledge.

Opportunity will crowd you if you are prepared, for opportunity is eternally existent everywhere, and is every man's up to the limit of his capabilities.

The world of electrical interests needs those who can grasp opportunity, for the improvement which follows makes for increased business.

Improve your opportunities.

PERSONALS

ITEMS FOR THIS DEPARTMENT ARE SOLICITED FROM ALL READERS

J. Guilbert, of Guilbert Bros., electrical contractors, San Jose, is at San Francisco.

Mortimer Fleishhacker, president Great Western Power Company, has returned to San Francisco from New York.

J. O. Jensen, secretary and manager Los Gatos Telephone Company, was at San Francisco during the past week.

R. B. Fairly, representing Kellogg Switchboard & Supply Company in the Pacific Northwest is a San Francisco visitor.

E. S. Berdine, representing the Gleason, Tiebout Glass Company, has returned to San Francisco from Southern California.

L. E. Voyer is now illuminating engineer, Edison Lamp Works of General Electric Company in the San Francisco office.

Arch. M. Jones of Jno. A. Roebling Sons' Company has been transferred from San Francisco to the Seattle office of the company.

H. D. Brainard, sales manager of the Seattle office of the Western Electric Company, spent the past week at Portland, Oregon.

L. H. Baldwin, representing Kellogg Switchboard & Supply Company at Los Angeles, is making a business trip throughout New Mexico and Arizona.

E. A. Wilcox, Twelfth Mars of the Jovian Order, was a visitor at Salt Lake, having come from Twin Falls, Idaho, to assist Statesman Jones in his Rejuvenation.

Hal Lauritzen, manager Western Division Holophane Works of General Electric Company, is at Los Angeles and expects to remain in that city for about two weeks.

L. M. Cargo, district manager of the Westinghouse Electric & Manufacturing Company at Denver is at Salt Lake City on his regular trip of inspection over the territory.

A. G. Wishon, general manager San Joaquin Light & Power Company, and **G. H. Newlin**, purchasing agent of the company were at San Francisco during the past week.

W. R. Lyall of the D. & W. Fuse Company has returned to San Francisco, having made an extensive trip through the Pacific Northwest and the country east to Salt Lake City.

S. A. Chase, special representative of the Westinghouse Company, recently from Pittsburg, Pennsylvania, is at San Francisco and will visit other coast cities before returning east.

R. Q. Cleavenger, representative of the Phoenix Glass Company, New York, is at Salt Lake City. He was a visitor at the Utah Electric Club luncheon and made a few well chosen remarks.

Henry F. Holland and **Arthur L. Faber** went from Salt Lake City to Pocatello on the 18th of April to assist Statesman Brokaw in the Jovian Rejuvenation held in that city on the above date.

P. B. Sawyer, general manager Utah Power & Light Company, has been called to New York City in connection with the retirement of the short time notes of his company which is now in progress.

H. D. Currier has been appointed chief engineer of the Kellogg Switchboard & Supply Company, Chicago, Ill., and has complete charge of the company's engineering department, laboratories and engineering inspection.

J. B. Balcomb is executive engineer in charge of construction of the new hydroelectric power plant of the Wild Horse Power & Milling Company, Andrews, Ore., and will later take charge of the operation of the plant.

Newcomb Carlton has been elected president of the Western Union Telegraph Company in place of **Theodore N. Vail**, who remains president of the American Telephone & Telegraph Company from which the Western Union was recently divorced.

J. M. Smith, assistant to manager, Holophane Works of General Electric Company, Cleveland, Ohio, who has been visiting Pacific Coast cities, is now at Portland, Oregon. Accompanied by **J. O. Presbey**, representative of the company in that territory, he will visit Seattle; also Salt Lake City and Denver on his way East.

J. G. Scrugham, University of Nevada, Reno, Nev., was appointed committee chairman of the electrical section of the Nevada Industrial Safety Conference for 1914. The following were appointed directors: **E. D. Brown**, superintendent Truckee River General Electric Company; **W. N. Chatfield**, manager Pacific Power Company; **H. S. G. Hurlburt**, superintendent Pacific Power Company; **B. G. McBride**, manager Elko-Lamoille Power Company; **L. W. Crehore**, electrcal engineer Fallon city plant; **G. L. Perrin**, chief electrician Nevada Hills Mining Company; **Joseph Beane**, electrical superintendent U. S. reclamation service; **R. E. Middagh**, engineer Nevada Con. Copper Company; **Thos. G. True**, chief electrician Reno P. L. & W. Company; **T. R. Landsborough**, electrical engineer Tonopah Extension Company; **J. K. Poe**, electrical superintendent Goldfield Consolidated Company; **A. D. Voss**, electrical engineer Buckskin Mines Company; **F. B. Mechling**, manager Nevada-California Power Company; **R. R. Layman**, district superintendent Nevada-California Power Company; **W. K. Freudenberger** and **C. S. Young**, superintendent Lovelock Power Company. **F. O. Broili**, Nevada Machinery & Electrical Company, was appointed committee secretary. This committee is charged with the duty of recommending electrical standards for Nevada.

MEETING NOTICES.

Seattle Jovian League.

The Seattle Jovians have decided to suspend their weekly meetings until next September, this action being confirmed at a recent meeting of the executive committee.

Seattle Engineers' Club.

The members met at luncheon on Thursday, April 23d, at the College Club, and afterwards C. P. Tatro, manager of the Marine Wood Preservative Company of Seattle, gave an interesting talk on "Preservation of Steel and Wood for Submarine Construction in Both Salt and Fresh Water."

Los Angeles Section, A. I. E. E.

At the next regular meeting of the Los Angeles Section of the A. I. E. E., a paper will be read by Julian Adams on "Railway Substation Operation." The meeting will be held on April 28th at Blanchard Hall. An announcement of the Pacific Coast Convention to be held at Spokane, Wash., in September will be made at that time.

San Francisco Electrical Development and Jovian League.

Members of the league met on Tuesday, April 28th, at the Hof Brau and after luncheon listened with enjoyment to the breezy banter and pleasant reminiscences of the "Perripatetic Peregrinations" of Joe Thompson of the Pacific Electric Manufacturing Company. There was nothing else to do at the close, and after an unusually hearty vote of thanks had been tendered, but to appoint Mr. Thompson, Stentor of the Jovian Order and this was done with the unanimous and hearty approval of all present.

Alameda County Electrical Development League.

The regular luncheon meeting was held at a cafe in Oakland on April 25th, Mr. Geo. Furniss presiding. After some discussion it was decided to appoint a grievance com-

mittee to investigate controversies of various kinds. A paper on "Figuring Profits" was then read by Mr. A. H. Halloran. As an aftermath of the discussion which ensued it was decided to devote the May meeting to a consideration of various cost estimates on an electrical installation for a five room cottage to be submitted by contractors. As usual the meeting was well attended and of great value to all members.

San Francisco Section A. S. M. E.

A meeting of this section of the American Society of Mechanical Engineers will be held at the rooms of the Engineers' Club, Hotel Sutter, San Francisco, on May 6th, at 8 p. m. The subject of the evening will be the "Stationary Diesel Engine," the paper being read by Herbert Haas. Mr. Haas' discussion will be illustrated by lantern slides. Following the reading of the paper a general discussion will be held in which all present are invited to participate. Members may extend an invitation to be present to any friend who may be interested. The executive committee hopes that as many as possible may take advantage of this opportunity to familiarize themselves with this interesting type of prime mover that seems destined to exert a strong influence upon Pacific Coast power conditions.

The Jovian Electrical League of Southern California.

The weekly luncheon at Christopher's on Wednesday, April 22d, was attended by about 100. Joseph W. Ford, assistant district attorney, gave a talk on "The Duties and Responsibilities of a District Attorney." Mr. Ford, who is well-known in connection with the prosecution of the men who were found guilty of the Los Angeles Times outrage, eloquently portrayed the problems confronting a prosecuting officer and the various elements which enter into a case before the same can be faithfully prosecuted. His exposition of the theme was a revelation to his hearers and no doubt heightened their respect for the speaker and the profession which he represents. The chairman of the day was Harry W. Harrison. A League dance was held at Frazier's Million Dollar Pier, Ocean Park, on Wednesday evening, April 29th. A very successful rejuvenation is promised for Friday evening, May 15th, at the old Clark Hotel, as over 30 "victims" have already been secured. There is great rivalry among the members for the handsome prizes offered by the League for the men securing the largest number of candidates.

Jovian Rejuvenation at Salt Lake City.

A highly successful Rejuvenation of the Jovian Order was held in Odd Fellows' Hall on Tuesday, April 21st, under the direction of John C. Jones, Statesman for Utah. This rejuvenation formed the concluding exercises of the two days' session of the district managers and commercial representatives of the Utah Power & Light Company, and most of the initiates were obtained from the ranks of these load builders. The initiatory exercises were handled by the following degree team:

Jupiter, Stanley S. Stevens.	Apollo, F. H. Barber.
Neptune, E. K. Bacon.	Pluto, R. Ackerman.
Vulcan, H. F. Holland.	Mars, Bayard W. Mendenhall.
Hercules, W. C. Wurfel.	Avrenim, J. B. Ambler.

Twenty-one candidates were initiated into the order. At the conclusion of the rejuvenation a Joviation and banquet were held at the Hotel Utah, H. T. Plumb acting as toastmaster. The following toasts were responded to: Manufacturers, Jobbers, Central Stations and the Jovian Order, Bayard W. Mendenhall; The National Organization, E. A. Wilcox; Jovianism, W. C. Wurfel; Jovian Philosophy, H. P. Holland; Reminiscences, L. M. Cargo.

Utah Power & Light Company Conference.

The first "Get Together" conference of the New Business Department of the Utah Power & Light Company was held in Salt Lake City April 20th and 21st. This company during the past eighteen months has taken over the electric lighting and power systems of a majority of the towns in southern Idaho and in northern and central Utah, and the conference was called for the purpose of bringing the various representatives of the company, particularly the new business department, into a closer relationship with the general office and with each other. About thirty representatives from towns outside of Salt Lake City attended the meetings, in addition to all employes in the head office interested in the matters under discussion.

At the dinner given by the company to its representatives at the Hotel Utah on Monday evening, the principal officers of all of the central station companies in this district, and representatives of the manufacturers, jobbers and electrical contractors doing business in territories served by the Utah Power & Light Company were present as guests.

The program of the two days' conference follows:

Monday.—Purpose and Plan of Meeting, W. R. Putnam, commercial manager; The Utah Power & Light Company, P. B. Sawyer, general manager; Power Department, L. Brandenburger, in charge; Mining Power Loads, R. Timmerman, Bingham; Sundry Power, C. W. Cates, Idaho Falls; Pumping for House Pressure System, Electric Refrigeration Loads, P. H. Craven, American Fork; National Electric Light Association Membership, S. R. Inch, general superintendent; Discussion of Accounting and Special Investigation—Department Forms and Routine, G. B. Thomas, V. Y. Davoud; Advertising, L. S. Gillham.

Tuesday.—Irrigation Department, W. H. Trask, Jr.; Small Irrigation Loads, T. A. Phillips, Layton; Centrifugal Pump Developments, C. H. Hills, Worthington Pump Company; Single-Phase or Three-Phase Motors—Where to Be Used, Markham Cheever; Lighting and Appliance Department, J. F. Derge; Sign and Window Lighting, C. W. Kendall, Ogden, and W. G. King, Electric Sign Service Company; Electric Cooking, M. R. Lott, Provo; General Improvements in Lighting Installations, Mr. Robinson, National X-Ray Company; Recent Developments in Street Lighting Systems, A. P. Merrill Provo; Purchasing Department A. D. Smith, purchasing agent.

NEWS OF THE P. P. I. E.

Railway passenger agents from all the principal lines of the United States have just finished a meeting in San Francisco at which the rates for the exposition were agreed upon. The exceptional rate of one way fare for the round trip was announced after several days' deliberation and this affords the best opportunity from an economic standpoint for those who have long been planning a western trip. The railroads are expecting to carry a million people from the eastern states to the exposition in 1915. The American Association of Traveling Passenger Agents has also selected San Francisco for the meeting November 9, 10 11 and 12, 1914.

The executive committee of the Traveling Passenger Agents visited the exposition grounds recently and, in the words of the secretary, Elliott T. Monett, "everybody was simply dumbfounded upon finding 70 per cent of the buildings completed, which without doubt when completed will be the most beautiful picture ever witnessed in this or any other country."

The greatest feature of the new rates for 1915 is that they are good for 90 days and will be on sale at any station on any day.

The first of the great wooden ribs that are to form the dome of the Palace of Manufactures was set in place on April 1st. This dome is the last to be completed of all the exhibit structures of the same material and the delay was caused by the storm of last February, which blew down parts of the structure left over night without more than temporary supports.

The demands for space in human welfare exhibits to be placed in the Palace of Social Economy and Education has been so heavy that arrangements are already being made for the overflow. Nearly three-quarters of an acre more will be necessary to provide room for the exhibits that have been culled from those for which application for space was made.

In addition to the temporary fire station already installed on the exposition grounds with a complement of men, horses and apparatus, a city fire tug has been assigned to the exposition and a wharf is being built especially for it along the esplanade of the Marina.

The Panama-Pacific International Exposition from September 20 to 25, 1915, will be the meeting place of the

largest body of distinguished engineers ever assembled in one place and Colonel George W. Goethals will preside over the first international engineering congress. As Colonel Goethals will be the hero of the achievement which the exposition is to commemorate this meeting will be one of the most important that will be held in San Francisco in the time of the exposition.

RAILROAD COMMISSION OF OREGON.

On May 4th at 10:30 a. m. at the court house, Portland, Oregon, there will be a continuation of the hearings in regard to the application of the United Railways Company for authority to increase passenger fares, and the Tualatin Valley Transportation Association vs. Oregon Electric and United Railways Company involving fares on the Oregon electric lines.

IDAHO PUBLIC UTILITIES COMMISSION.

The commission ordered that the Idaho Power & Light Company and the Great Shoshone & Twin Falls Water Power Company put into effect the following schedule of rates to be charged by them respectively for electrical current furnished at all points and localities east of Mountain Home, and including Mountain Home. Commercial and residence lighting:

First 20 kw.-hr., 09 per kw.-hr.
Next 30 kw.-hr., .08 per kw.-hr.
Next 40 kw.-hr., .07 per kw.-hr.
Next 50 kw.-hr., .06 per kw.-hr.
Next 100 kw.-hr., .05 per kw.-hr.
Next 200 kw.-hr., .04 per kw.-hr.
Next 500 kw.-hr., .03 per kw.-hr.
All additional kw.-hr., .02 per kw.-hr.

A domestic and commercial cooking rate was also ordered but was later cancelled.

The above schedule was also ordered effective for American Falls, Pocatello, Fort Hall and Blackfoot, all of which are served by the Southern Idaho Water & Power Company.

The Hailey Electric Company engaged in business in the vicinity of Hailey, filed with the commission a schedule of its rates and charges for electric current, which were found to be similar to the rates and charges for such service heretofore established by the predecessor in interest of said electric company and ordered approved.

A rehearing in the case of the Southern Idaho Water Company vs. Beaver River Power Company was refused by the commission.

On complaint brought by the Great Shoshone & Twin Falls Water Power Company against the Idaho Power & Light Company and the Beaver River Power Company, the commission ordered the defendant companies to discontinue the construction of a distribution system commenced, in the city of Buhl, in contravention of the laws of the state.

NEWS OF THE CALIFORNIA RAILROAD COMMISSION.

The commission has rendered a decision in which it authorizes the Sunset Telephone & Telegraph Company to sell its system at Tulare, Tulare county, to the Tulare Home Telephone & Telegraph Company.

Reclamation District No. 551, embracing 9000 acres of swamp land in the vicinity of Vorden, Sacramento county, has filed a complaint with the commission against the Great Western Power Company in which the district claims that the rates of the Great Western Power Company for 50 h.p. motors or over, within the territory of the reclamation district, are unreasonable and unjust.

The Calistoga Electric Company has filed an application with the railroad commission asking for a rehearing of the application of the Napa Valley Electric Company which was granted a certificate of public convenience and necessity March 31st by the commission to serve territory adjacent to the town of Calistoga.

The United Railroads of San Francisco, E. H. Rollins and Sons and Union Trust Company of San Francisco have filed an application with the commission asking for authority to execute a car equipment trust agreement. Under the proposed agreement the United Railroads will purchase 65 new cars for use in San Francisco at an aggregate sum of $365,000.

The Happy Valley Land & Water Company has applied to the commission for authority to issue 1000 shares of its capital stock to be sold at the par value of $10 per share. Funds to be derived from the sale of stock will be applied to liquidating indebtedness and to the construction of a dam to impound water in Happy Valley, Shasta county.

The Modoc County Irrigation Company has filed an application with the commission asking for authority to mortgage its property in a sum not to exceed $750,000 and to issue bonds for the purpose of constructing its irrigation system at Cowhead Lake in the northern part of Modoc county. The company anticipates placing 150,000 acres of arable land under its ditch system.

The Glendale & Eagle Rock Railway Company has filed a supplemental application with the commission, asking for authority to issue first mortgage 15 year 6 per cent bonds in the sum of $122,801.55. The company had applied to the commission for an order authorizing an issue of $150,000 and on April 11th was authorized to issue $59,589.55 only. The supplemental application is based upon a schedule of additional physical equipment labor charges and outstanding notes.

The Long Beach Consolidated Gas Company has filed an application with the commission asking for authority to issue 1400 shares of its preferred capital stock at the par value of $100 per share at not less than 80, and for authority to sell 60 of its first mortgage 6 per cent gold bonds at a price not less than 95. Of the funds to be derived from such sales, the applicant wishes to apply $108,000 to outstanding notes and the balance to accounts payable estimated at $69,131.31.

The Midland Counties Public Service Corporation of Los Angeles, formerly known as the Coalinga Water & Electric Company, has filed an application with the commission, asking for authority to extend the date of maturity one year on notes in the aggregate sum of approximately $150,000.

The Nevada County Narrow Gauge Railroad Company has filed an application with the commission for a rehearing in the matter of ascertaining the value of the property of the company. The company urges in its application that the present value is equal to the reproduction value.

ARIZONA CORPORATION COMMISSION.

The commission ordered that the Arizona Copper Company, Ltd., Clifton and Morenci, Arizona, make a monthly minimum charge of $1.00 per meter for electricity, but provided that the minimum absorb such quantities of electricity as may be consumed under regular schedule rates up to the full amount of the minimum charge.

The Nogales Electric Light, Ice & Water Company, Nogales, Arizona, was also given permission to make a similar minimum charge to its consumers; also the Flagstaff Electric Light Company, Flagstaff, Arizona, and the Desert Power & Water Company, Kingman, Arizona.

On application of the Yuma Gas Company, Yuma, Arizona, for approval, the rates submitted were approved, to become effective April 1, 1914, as follows:

First 600 cu. ft. or less, $1.00 per month.
First 10,000 cu. ft., $1.75 per M. per month.
Next 20,000 cu. ft., $1.50 per M. per month.
All in excess of 30,000 cu. ft., $1.25 per M. per month.

OREGON RAILROAD COMMISSION.

Annual Report for 1913.

Regulation of public utilities, together with steady growth of railroad business, has increased the work of the Railroad Commission of Oregon just 274 per cent in one year, measured by the volume of formal complaints handled. This is one of the features disclosed by the annual report of the commission for the year ending December 15, 1913, which has just been made public.

It is stated that 226 utility companies have been listed under the jurisdiction of the commission and considerable progress made in the valuation of several of the larger utilities, this being necessary before rates are fixed. The report brings the narrative of work performed down to December 15, 1913, and valuation investigations stated to be nearing completion are those of the Portland Railway, Light & Power Company, Coos Bay Water Company, St. Johns Water Works & Lighting Company, Rogue River Water Company of Grants Pass, Home Telephone & Telegraph Company of Southern Oregon, and the Salem Water, Light & Power Company. Water plant valuation is under way at Dallas, also valuation of the Pacific Telephone & Telegraph Company's plant at Oregon City, and it is stated that substantial reductions have been secured in light and power rates, without necessity for formal proceedings, in Dallas, Monmouth, Independence, Junction City, Corvallis and other towns of the Williamette Valley.

Concerning the business handled by the commission during the year, the report says:

"Listing of the complaints filed shows 352 informal railroad complaints compared with 301 filed in 1912. The number of formal railroad matters filed was 59, compared with 47 the previous years. In the utilities branch, 183 informal complaints and 70 formal matters were docketed. The increase in total number of formal complaints, which in most cases have necessitated hearings, from 47 in 1912 to 129 in 1913, or 274 per cent, indicates in a degree the expansion of the commission's work."

Disposition made of these complaints is reported in detail, and the distinction between formal and informal procedure explained, the former being matters in which hearings are required to thrash out questions of rates or service, the informal being taken up for adjustment on a mere statement of the grievance. Of the informal matters, 251 out of 370 of those relating to railroads were satisfactorily settled, 27 are pending, 22 were dropped because of lack of jurisdiction. Of the utility matters handled in like manner, 90 out of 153 are reported settled, 10 transferred, 5 pending, and 35 dropped because plaintiffs did not wish to go further.

"Valuation of the physical property of the Portland Railway, Light & Power Company," says the report, "is the largest single task ever undertaken by the commission. The rates charged and service rendered by this company directly affect not less than one-third of the people of the state, and it is only by a comprehensive investigation that any complaints arising in connection with the rates and service of this company can be placed on a basis for equitable and satisfactory adjustment."

Other topics covered by the report, aside from the statistical portion, are cases that have been appealed to the courts, proceedings before the Interstate Commerce Commission, manner of handling complaints, grade crossing problems, demurrage rules, railroad valuation, improvement of Corvallis & Eastern railroad between Corvallis and Yaquina, train delay reports, suspension of railroad tariffs, accident investigations, scope of work under the utilities act, methods of utility valuation, telephone and water rate cases, accounting department work, and commission merchant's act.

BOOK REVIEWS.

Incandescent Electric Lamps and Their Application. By Daniel H. Oglay; 107 pp.; 5x7½ in.; cloth bound. Published by Longmans, Green & Company, and for sale by Technical Book Shop, Rialto Building, San Francisco. Price, 80 cents.

This book which is of Longmans' Technical Handicraft Series, is written for the general reader and constitutes a comprehensive treatise of the subject. It carries the reader from the production of light to its efficient utilization, and on the way, deals with photometry, light distribution, calculation of illumination, the eye and the principles of vision, and lighting systems. The illustrations are also very complete.

Insulation and Design of Electrical Windings. By A. P. M. Fleming, M. I. E. E. and R. Johnson, A. M. I. E. E.; 224 pp.; 6x9 in.; cloth bound. Published by Longmans, Green & Company, and for sale by Technical Book Shop, Rialto Building, San Francisco. Price, $2.25.

In this treatise, which is fully illustrated, the authors have endeavored to set forth the underlying principles and methods whereby the design of insulation can be carried out with precision instead of by the process of trial and error which has apparently been generally used in the past for the solution of insulation problems. Insulation constitutes the most vulnerable part of electrical machinery and this work should have a wide and important application and use.

High and Low Tension Switchgear Design. By A. G. Collis, A. M. I. E. E.; 218 pp.; size 6x9 in.; cloth bound. Published by D. Van Nostrand Company, and for sale by the Technical Book Shop, Rialto Bldg., San Francisco. Price $3.50.

This work, which is profusely illustrated and contains sufficient line diagrams for a further explication of the text, also includes a number of oscillograph records which are unique and believed, by the author, to be the first published records of their kind. It consists of the result of researches made with the object of obtaining accurate data as to the effects caused by opening and closing circuits with various types of electrical apparatus. It goes into the main elements of design both of alternating and direct current switchgear, being divided into two parts for that purpose. Engineers and artisans in all departments of electrical engineering practice will find this book an invaluable aid in acquiring a better knowledge of this most important part of electrical equipment.

The Efficient Kitchen. By G. B. Child; 242 pages, 5x8. Published by McBride, Nast & Co., New York City.

While it is not the custom of this journal to review miscellaneous works one fault in this otherwise excellent text should be brought to the attention of electrical men, so that correction may be made in future editions of this and similar books. In the 242 pages only six references have been made to electric lighting and cooking, and several of these are not in accord with recognized facts as the following quotations show: "One bulb **centrally** located will give ample light for a small kitchen"; "in certain parts of England electricty for cooking purposes has been offered at a rate of one cent per kilowatt hour. This is unheard of in the United States, where ten cents is an average rate and twelve or fifteen not at all unusual." Misleading statements also appear regarding the high cost of electric cooking utensils, washing machines and no reference is made to the many small motor appliances now found in the really efficient kitchen.

PUBLICATIONS RECEIVED.

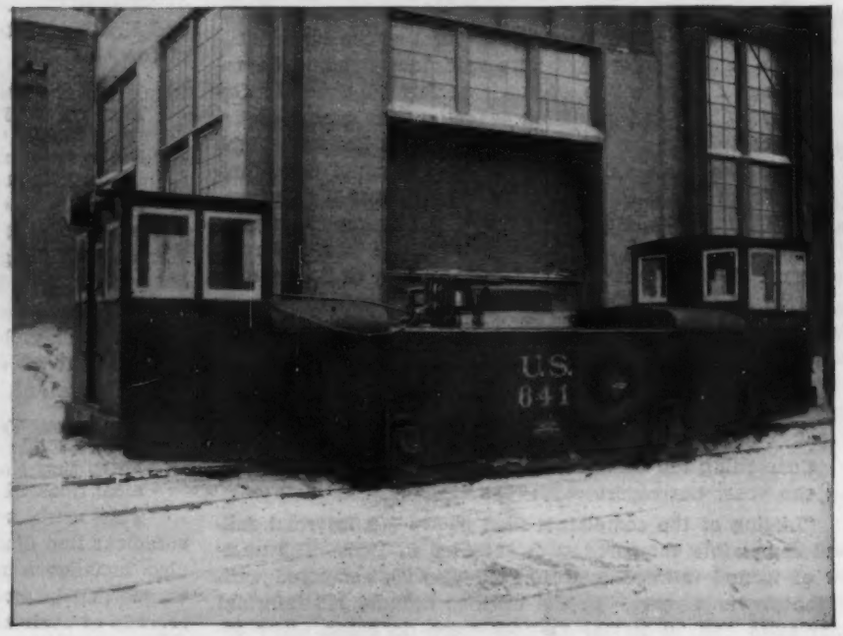
The fifth edition of the Western Electric Company's copyrighted bulletin "How to Figure Illumination—Also a Complete Catalog of Sunbeam Mazda Lamps" is just off the press and is being distributed. This bulletin gives information for planning the illumination of interiors.

INDUSTRIAL

PANAMA CANAL ELECTRIC TOWING LOCOMOTIVES.

The first electric towing locomotives for hauling vessels through the locks of the Panama Canal are now being delivered at the isthmus. In all forty of these "electric mules" are being built by the General Electric Company. The machines weigh 82,500 lb.; measure 32 ft. 2½ in. long by 8 ft. wide by 9 ft. 3 in., the greatest height over the cabs; have an available tractive effort as high as 47,500 lb. and a windlass rope pull of 25,000 lb,, and four of them, two on each side, will ordinarily propel steamships through the locks. Sometimes six engines will be needed to handle extra large vessels; in every case two astern, acting as a brake on the ship's movements, will give direction to her course. No vessel will be allowed to enter the locks and go through on her own power.

The locomotive is built up of cast steel side and end frames, cross ties axles with wheels in accordance with MCB standards. The entire frame is supported from journal boxes of the regular railway type by means of coiled springs. The sides and top of the body are enclosed by sheet iron covers which fit in place and are very easily removable. At each end are enclosed cabs so that the locomotive may be operated from either end.



Type of Electric Locomotive for Towing Ships Through the Panama Canal Locks.

The locomotive is propelled by means of a rack rail while towing and while going up or down the steep grades from one level to another at a speed of 2 miles per hr. While running idle or on return tracks, the speed is changed to 5 miles per hr. and the machine is propelled by the regular traction method, the rack pinion being entirely released. This change is effected by manually-operated clutches located in the gear mechanism. The locomotive is driven by two 75 hp. totally enclosed motors of the mill type, one being direct connected through reduction gearing to each axle. Three-phase, 25 cycle, 220 volt current is used and is collected by contact plows. The motor and traction gearing is mounted on a common baseplate, which in turn is mounted on a driving axle and spring suspended to the locomotive frame the same as in regular railway practice.

In the center of the locomotive is located a vertical windlass with drum, the capacity of which is 800 ft. of 1 in. steel hawser cable. The windlass cable is handled by two 20 h.p. motors, also totally enclosed and of the mill type. One is geared for a rope speed of 12 ft. per minute at a pull up to 25,000 lb. at 2 ft. radius, and its function is to adjust the position of the ship for anchor or while being towed through the locks. The other motor is geared for a rope speed of 200 ft. per minute at 2 ft. radius, and its duty is to take up slack or pay out cable or wind in any part of the entire length of cable as may be required.

The traction motors as well as the windlass motors are controlled from either cab. In other words, the control equipment is duplicated. The two traction motors are operated by one master controller and contactors forward and reverse; while the windlass motors are operated by a reversible drum controller, and the clutch on the main vertical shaft by a solenoid.

TRADE NOTES.

The complete lighting fixture equipment of the Hinds-Rolph Building, San Francisco, has been made by the Mohrlite Company, San Francisco. It comprises 79 commercial type Mohrlite units.

M. J. Walsh & Company, of Portland, Oregon, have secured the electrical contract for the new apartment house being constructed at Nineteenth and Lovejoy streets, Portland, Oregon. The building is owned by the Royal Arms Company.

HIGH POWER LAMP STREET LIGHTING.

The natural tendency at the present time in street lighting is toward a single light standard having a globe of ornamental design. The unit to meet these requirements, however, must also be of high efficiency.

Such a unit has recently been developed by the Holophane Works of General Electric Company, Cleveland, and is shown mounted on a standard in the accompanying illustration. The unit consists of two pieces. The upper part is made of Pyro, a dense opal glass, and the lower of a light density opal glass or crystal, roughed inside glass. As a result, the upper portion acts as a reflector, throwing a considerable proportion of the light on the street surface, where it becomes useful in performing the function of street lighting. The unit is designed for use with the new high efficiency Mazda lamps of either the multiple or series type. With a 750-watt multiple Mazda lamp the maximum candle-power is 950 at an angle of about 65 degrees.

The ornamental appearance of this unit is very pleasing. This, together with its high efficiency of light distribution, makes it ideal for business district and boulevard lighting.

NEWS NOTES

INCORPORATIONS.

LOS ANGELES, CAL.—Meadows Water Company, $50,000, subscribed $30, by H. M. Hall, W. Mackendrick and W. A. Whelan.

WALLA WALLA, WASH.—Capitalized for $120,000 the Walla Walla River Power Company has filed articles of incorporation at Salem. The company plans to build a power plant several miles below the forks of the Walla Walla, taking water from the river through a flume. Power for pumping and other purposes will be sold.

SOUTH BEND, WASH.—The Willapa Power Company, recently granted a water and light franchise for South Bend, is incorporated with a capitalization of $1,000,000, divided into 10,000 shares of $100 par value. Its purpose is to supply electric power, water power, gas, etc. The site of its construction is the South Fork of the Willapa River, and the principal place of business South Bend.

TUCSON, ARIZ.—Articles of incorporation of the Three Rivers Land & Water Company have been filed with the Arizona Corporation Commission. The capital stock is $500,000, and the incorporators are T. H. Schuster, B. W. Smith and James R. Dunseath, all of Tucson. The nature of the proposed business is general real estate and water business, to include construction of necessary dams, canals, flumes, etc., also to construct and acquire telephone lines and stations and all necessary appurtenances thereto.

PARKER, ARIZ.—Articles of incorporation of the Parker & Colorado River Electric Railway Company have been filed with the Arizona Corporation Commission. The capital stock is $250,000, and the incorporators are: Thomas Taylor and David Connor of Jerome; J. E. Beck and W. H. Tharpe of Parker; I. W. Wallace, Bisbee and Wm. Drury, Lowell. The company proposes to construct and maintain an electric railway, telephone and telegraph business in and around Parker, and through the Colorado River Indian reservation, a distance of approximately 35 miles.

FINANCIAL.

SAN FRANCISCO, CAL.—At a meeting of the stockholders of the Ocean Shore Railroad Company last week a unanimous vote was taken to levy an assessment of $5 a share. This is expected to realize about $190,000, and it is said this sum will meet the company's requirements until February, 1915.

GLENDORA, CAL.—The stockholders of the Glendora Light & Power Company at a meeting held today, passed a resolution petitioning the superior court for the dissolution of the company and empowering the board of directors to distribute, pro rata, the proceeds of the sale of the electric light and power plant. The distribution is to be made as soon as it can be legally done. The Glendora Light & Power Plant was taken over the first of April after an agreement of purchase by the Pacific Light & Power Corporation. After the order of dissolution by the court, the plant will become an integral part of the general system of the Pacific Light & Power Corporation.

SAN FRANCISCO, CAL.—A group of the largest stockholders recently purchased $1,200,000 Great Western Power bonds. The price at which the sale was made is not given but it is said that the bonds were placed considerably above the present market. The last sales on the local exchange were at 81. The authority given by the state railroad commission was to sell the bonds at a minimum price of 90, from which it is obvious that they could not have been sold at a lower figure. The proceeds from the sale will be used to make a number of small extensions during the next few months and to provide for the installation of another unit at the Great Bend power plant. Mortimer Fleishhacker, president of the company, also made arrangements while East to take care of the $1,250,000 Western Power notes maturing in July, 1915.

SALT LAKE CITY, UTAH.—A dispatch from New York says that the six per cent short time notes of the Utah Securities Corporation are now being retired. Although no amount was stated in the dispatch, it is understood that it is around $85, the price to which the securities have declined in the past few days. This price, however, shows a good profit for the holders of the notes, who were able to purchase them last fall as low as $72. The notes will be taken up by the Securities Company to the extent of $6,000,000, the amount available for this purpose from the proceeds of the sale of $10,000,000 of the bonds of the Utah Power & Light Company. The notes, of which there are now approximately $22,000,000 worth outstanding of an authorized issue of $30,000,000, were issued in connection with the purchase of properties now operated by the Utah Power & Light Company and the Western Colorado Power Company and for the construction of additional power and transmission facilities — these latter expenditures aggregating $6,000,000. The withdrawal of approximately one-third of the notes from the market by retirement will probably do much toward stiffening the quotations on the balance left outstanding, and as it will not be long until further tenders are asked for, the notes may be expected to remain firm around present prices.

ILLUMINATION.

AUBURN, WASH.—The Auburn Gas Company has applied for a franchise to lay gas pipes on the streets and alleys of this city for 25 years.

ST. HELENA, CAL.—The contract for installing 37 electroliers on Main street has been awarded to the Napa Valley Electric Company for $3108.

CHEHALIS, WASH.—The Chehalis-Centralia Gas Company has reduced its gas rates, in effect as of April 1, 1914. The new maximum rate is $1.75 per 1000 and graduates down to $1.30 per 1000.

NOGALES, ARIZ.—The common council has called an election for May 25th, to submit to the qualified voters the question of granting an electric light and power franchise to Spiro S. Prots and Monte M. Mansfield. The franchise is to run 25 years, commencing June 15, 1914.

GLOBE, ARIZ.—Howard L. Sawyer, consulting engineer, employed by the city to make a disinterested estimate of the cost of a municipal light plant in Globe, has placed the estimate at $89,800, power plants and equipment, engines, switchboards, generators, etc., to cost $45,300 and distributing system to cost $15,600.

BAKER, ORE.—The examinations and reports department of H. M. Byllesby & Company has been employed by the Eastern Oregon Light & Power Company to make a complete inventory and valuation of its property in the state of Oregon. The appraisal is regarded as a necessary foundation for the adequate presentation of the company's rate schedules to the Oregon Public Service Commission. The Eastern Oregon Power Company owns all the available water power in the vicinity of Baker (formerly Baker City) and La Grande, and serves a considerable number of communities.

LOS ANGELES, CAL.—The city council has set aside the temporary gas rates recently fixed by the board of public utilities and determined that the natural gas rate for the city proper should be fixed at 40c per 1000 cubic feet from the time the ordinance fixing the rate becomes effective until July 1, the date when new utility rates shall become effective for the ensuing fiscal year. At the same time the council determined that the natural gas rate for the harbor district shall be 70c per 1000 cubic feet. The city attorney was instructed to present the necessary ordinance fixing the new gas rates.

SOUTH PASADENA, CAL.—Steel posts with a copper sheathing, similar to those in the Oak Knoll district, Pasadena, have been chosen for the ornamental street lighting system. Uniform posts for the entire city are to be used. Oak street will probably be the first to install ornamental lights, as the petitions have already been signed. If the city should act as a whole and install an ornamental lighting system the board of trustees would be enabled to purchase the electric energy at a very low wholesale rate, which would be about 3½ cents per kw.-hr. instead of the present rate. The streets committee is to investigate putting the system in over the entire city at the same time. The metal posts have a base and capital of cast iron, while the column is a steel shaft, all locked together by the rods extending the entire length of the post. The steel shaft is covered with sixteen ounce copper, and the cast iron parts are painted to match the shaft.

TRANSMISSION.

CASHMERE, WASH.—The Cashmere Water Power Company is seeking a franchise for light and power privileges. L. H. Titchenal is president and treasurer of the new company.

PORT ANGELES, WASH.—A resolution was passed by the city council recently granting the Olympic Power Company the right to construct and maintain a transmission line in this city.

NAPA, CAL.—Bids will be received by the board of supervisors up to May 13th for the franchise of the Calistoga Electric Company to erect lines for transmitting electricity in the county of Napa.

ANDREWS, ORE.—The Wild Horse Power & Milling Company has completed preliminary surveys and is having plans prepared for a hydroelectric power plant to be constructed near Andrews at the mouth of the canyon of Wild Horse Creek. The nower will be used for miscellaneous purposes.

SAN FRANCISCO, CAL.—The Pacific Gas & Electric Company has arranged the expenditure of $1,000,000 for extensions and improvements deemed necessary to take care of the extra service during 1915. New substations have been arranged for, and contracts for the rotary transformers and other machinery have been let to the Westinghouse company. The company also has contracted for a wide extension and enlargement of its gas main system.

SAN BERNARDINO, CAL.—Material is on the ground and work will be begun at once on the construction of the power line from this city to El Centro in the Imperial Valley by the Southern Sierra Power Company. The line will be an extension of the line from Inyo county to this city and when completed will be the longest high power line in the world, covering a distance of 586 miles. It is expected the line will be completed into the Imperial Valley in from two to three months, as work is to be rushed.

ROSEBURG, ORE.—The Oregon & California Power Company has made application to the county court for the use of public roads in Douglas county for the construction, maintenance and operation of poles and wires for the transmission of electric current. The company owns six large generating plants in Jackson, Josephine and Klamath counties, Ore., and in Siskiyou and Shasta counties, Cal., and it is now invading northern territory. Recently it bought the plant at Glendale, and the company wishes to enlarge in its Douglas county field, by selling electricity to the farmers. This power will be used for all purposes, especially pumping water for irrigation, according to their plans. It will not operate in Roseburg, or in competition with present plants, according to its statements to the county court. The company now has over 400 miles of line, and supplies 31 towns and villages with electric service.

BRIGHAM CITY, UTAH.—The city council of this city has decided to wage a vigorous campaign against the extravagant use of electric power by the patrons of the municipal plant. The municipal plant has always furnished service on a flat rate basis and the patrons have been so extravagant in the use of their lamps and appliances that the lines have become so heavily loaded that it is difficult to give good service. A circular letter will be issued and sent to all users of current, warning them against the use of more electricity than they pay for. After this warning, a canvass will likely be made to determine just how much power is being used by each consumer. The council also proposes to employ a competent electrical engineer to make a complete inspection of the city's electric light system and make a report of conditions as he finds them. This will be done for the purpose of ascertaining what repairs are necessary and what will be required to bring the plant up to date.

TRANSPORTATION.

LOS ANGELES, CAL.—Plans for the Pacific Electric car line extension into Griffith Park are being considered by the park commission.

RED LODGE, MONT.—In the elections in Red Lodge and Bear Creek the granting of a franchise to the Red Lodge Electric Railway Company carried by a large majority.

FRESNO, CAL.—Bids will be received up to June 1 for the sale of a franchise applied for by the Fresno Interurban Railway Company to construct a railroad on Fresno avenue.

SAN DIEGO, CAL.—The San Diego Electric Railway Company has presented a petition to the city council asking for new franchises on F and Laurel streets and for permission to take over the Point Loma Railroad.

SACRAMENTO, CAL.—The petition of Z. P. Dyer, owner of one share of stock in the Sacramento Valley Electric Railway, for an injunction to stop that corporation from building twelve miles of line from Dixon to Sacramento, was denied by Justice Seawell.

SACRAMENTO, CAL.—One hundred and fifty men are engaged in laying double tracks on the Tenth street line from a point north of Q street to Y street, which work when completed will provide a double track to the baseball grounds at Buffalo Park. It is expected to operate cars over the new tracks within three weeks. The work is being done in accordance with an order of the city commission by the Pacific Gas & Electric Company. Trilby rails are being laid.

SAN FRANCISCO, CAL.—The supervisors have authorized the building of the Masonic avenue extension of the Geary street car line to the baseball park, to cost $29,513. It is proposed to have Mahoney Bros. do the work under the present contract for building the Van Ness avenue and Chestnut street lines at the same unit cost. Assistant City Engineer Hunt said the city would save between $2000 and $3000 and some time by doing the work in this manner. The extension will extend four blocks, from Geary to Turk.

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